July 1946

Chemical Industries

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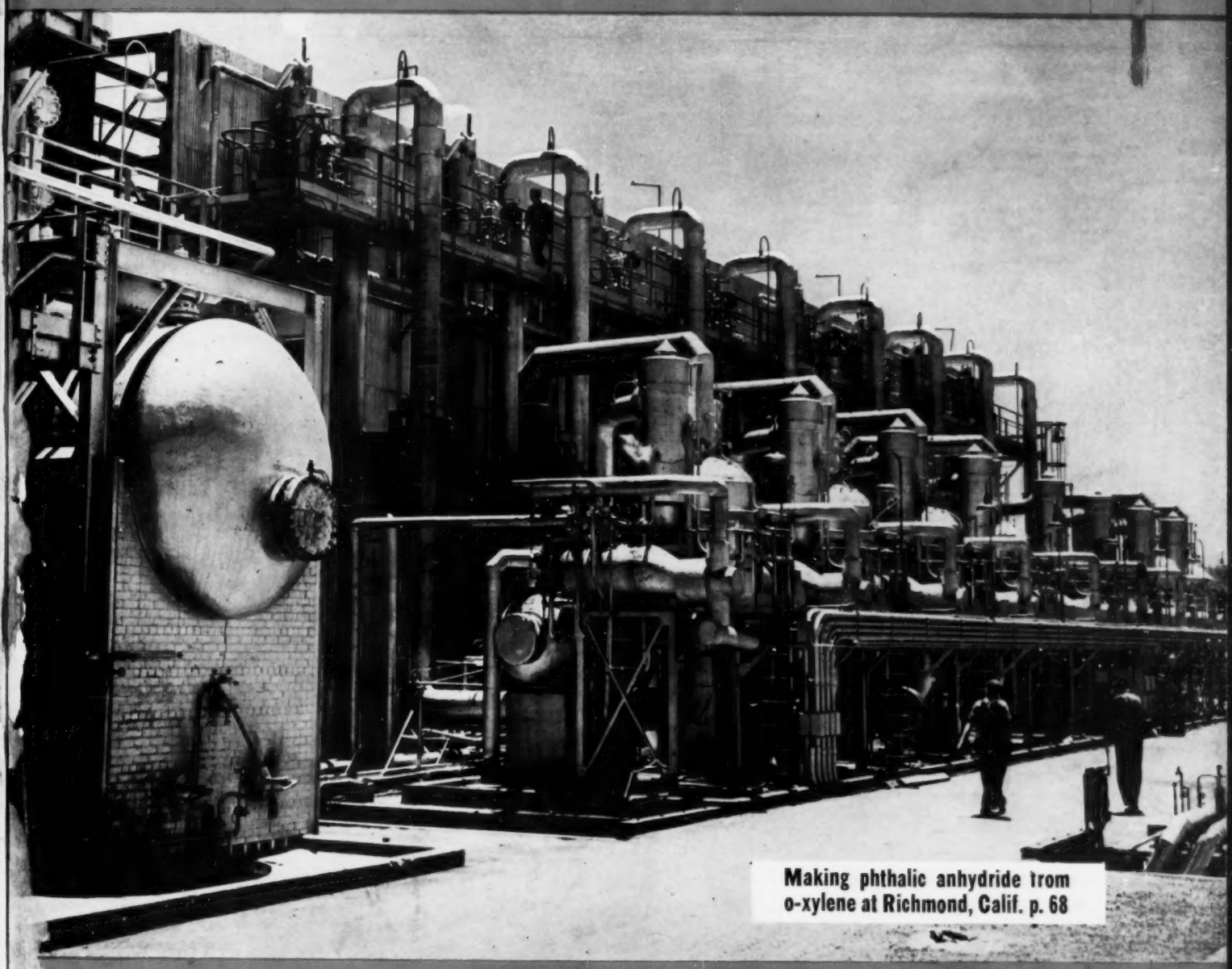

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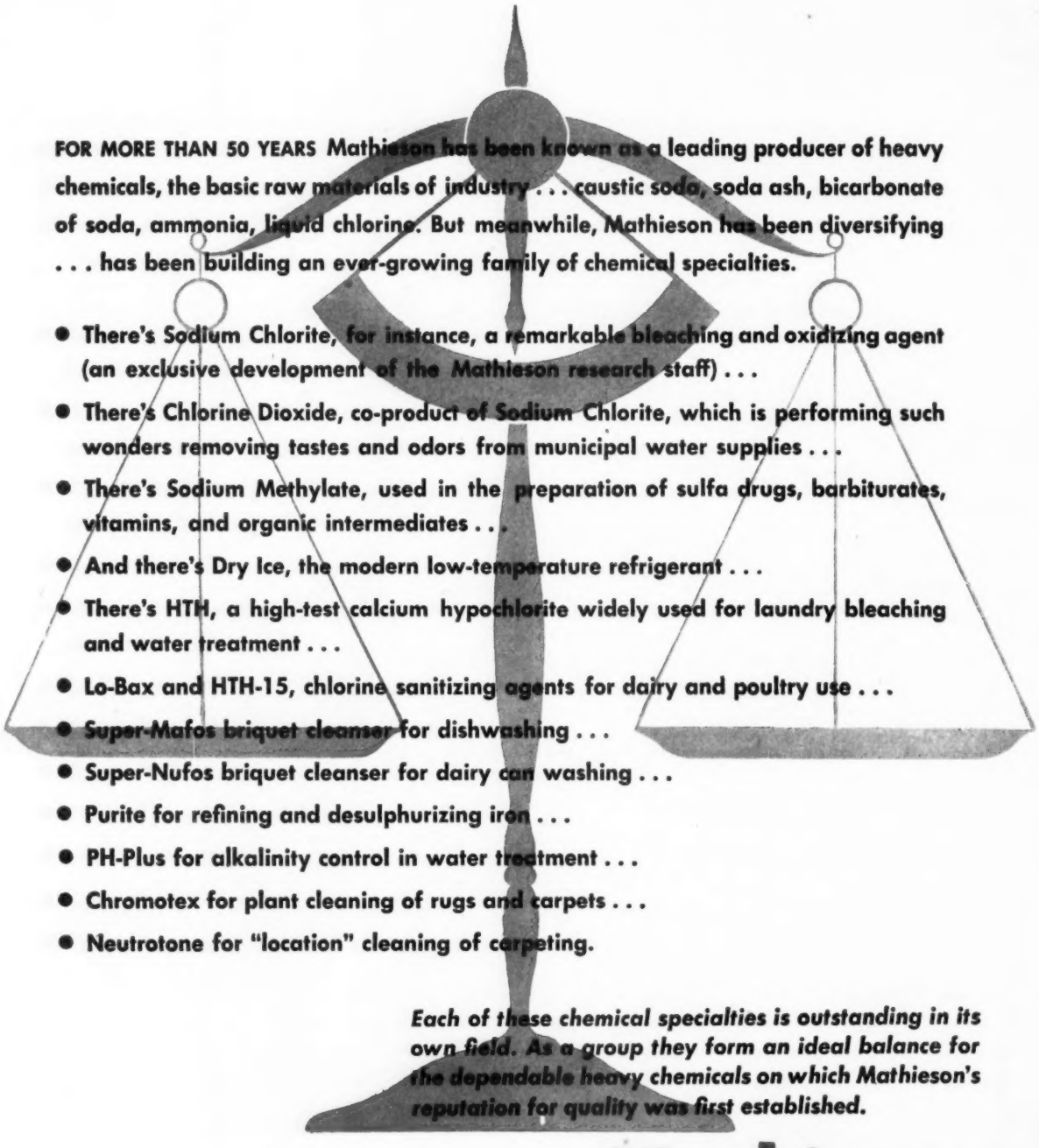

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THE CHEMICAL BUSINESS MAGAZINE

Chemical Industries

VOLUME 59
NUMBER 1

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COVER: General View of Phthalic Anhydride Plant of Oronite Chemical Co. at Richmond, Calif., showing bank of eight converters.

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THE READER WRITES

Shell Life of Rubber-Lined Cars

To the Editor of Chemical Industries:

We have read T. Pat Callahan's article in the April, 1946, issue of CHEMICAL INDUSTRIES on rubber-lined tank cars with a great deal of interest. Our company purchased the second rubber-lined tank car that was produced in the United States. It will interest you to know that we are still operating one tank car that we had rubber-lined in January, 1926. This shell was six years old when it was rubber-lined. In 1945 it was necessary to replace the under frame and this year we have given the shell a complete repair job in our shops. The car is back in service and we believe will continue to operate satisfactorily for at least several more years.

The maintenance of the exterior of the car is a good deal more of a problem than the maintenance of the rubber on the interior. We have recently received five new cars that we had partially covered with Neoprene on the exterior. The dome was covered completely and the shell covered around the dome down to and including the drip angles. It will take several years to determine how successfully this Neoprene sheet will stand up on these cars, but we are hopeful that this will materially increase the life of the shell.

There is still room for improvement on the design of the dome cover and dome fittings. There has been too little cooperation between tank car manufacturers and the rubber people.

SAM S. EMISON
Consolidated Chemical Industries Inc.
Houston 2, Texas

These comments by Mr. Emison, who is sales manager of CCI, provide a very interesting addition to Mr. Callahan's article in our April issue. Perhaps other readers would like to add further to the discussion.—EDITOR.

Saccharin from Anthranilic Acid

To the Editor of Chemical Industries:

The article in CHEMICAL INDUSTRIES, May 1946, on "Saccharin from Anthranilic Acid" calls for some comments.

In the Fahlberg process the oxidation of ortho toluene sulfonamide with potassium permanganate in alkaline solution leads directly to the sodium salt of saccharin, which is precipitated from the filtrate with hydrochloric acid. There is practically no ortho sulfamido benzoic acid in the reaction mixture; ring formation to the benzosulfimide takes place in the course of the oxidation. The mechanism of this reaction often has been misinterpreted in the chemical literature. This, however, does not in any way alter the process nor the cost or the product.

The article states that the cost price was as low as that of the old Fahlberg process. This, however, is of little significance, since the latter process, at least in this country, is obsolete.

Saccharin is now manufactured by oxidation of the sulfonamide with sodium bichromate and sulfuric acid. The yield is excellent, the raw materials are cheaper than those of the Fahlberg process, and the cost price of the saccharin is therefore considerably lower.

In order to be of modern industrial interest, comparison of any new saccharin process, as far as economics is concerned, should be made with the bichromate process rather than with the obsolete permanganate process.

JULES BEBIE
Consulting Chemical Engineer
St. Louis, Missouri

Socony Desiccant Is Not Used Catalyst

To the Editor of Chemical Industries:

The April 1946 issue of CHEMICAL INDUSTRIES contains an article on page 600 which refers to the Chemical Exposition held in New York in February. This article includes the following statement:

"Socony-Vacuum Oil Co. pictured in their booth the extent of the variety of products available from petroleum and gave away samples of used bead catalyst in an effort to find a practical use for the material."

Since the statement is decidedly erroneous, we wish to correct it. We refer specifically to the implication that we are attempting to market used bead catalyst as a desiccant. Actually, the product in question, which has been branded S/V Sovabead, was designed specifically as a desiccant, and is definitely not used catalyst.

It is a fact that the bead catalyst used in gasoline production is a potential drying material. The product branded S/V Sovabead, however, is far superior in this property. Although S/V Sovabead is somewhat dark in color, unlike the clear bead catalyst, its color is the natural result of its production processes, and is not to be construed as a deterioration from usage.

(*Turn to page 12*)

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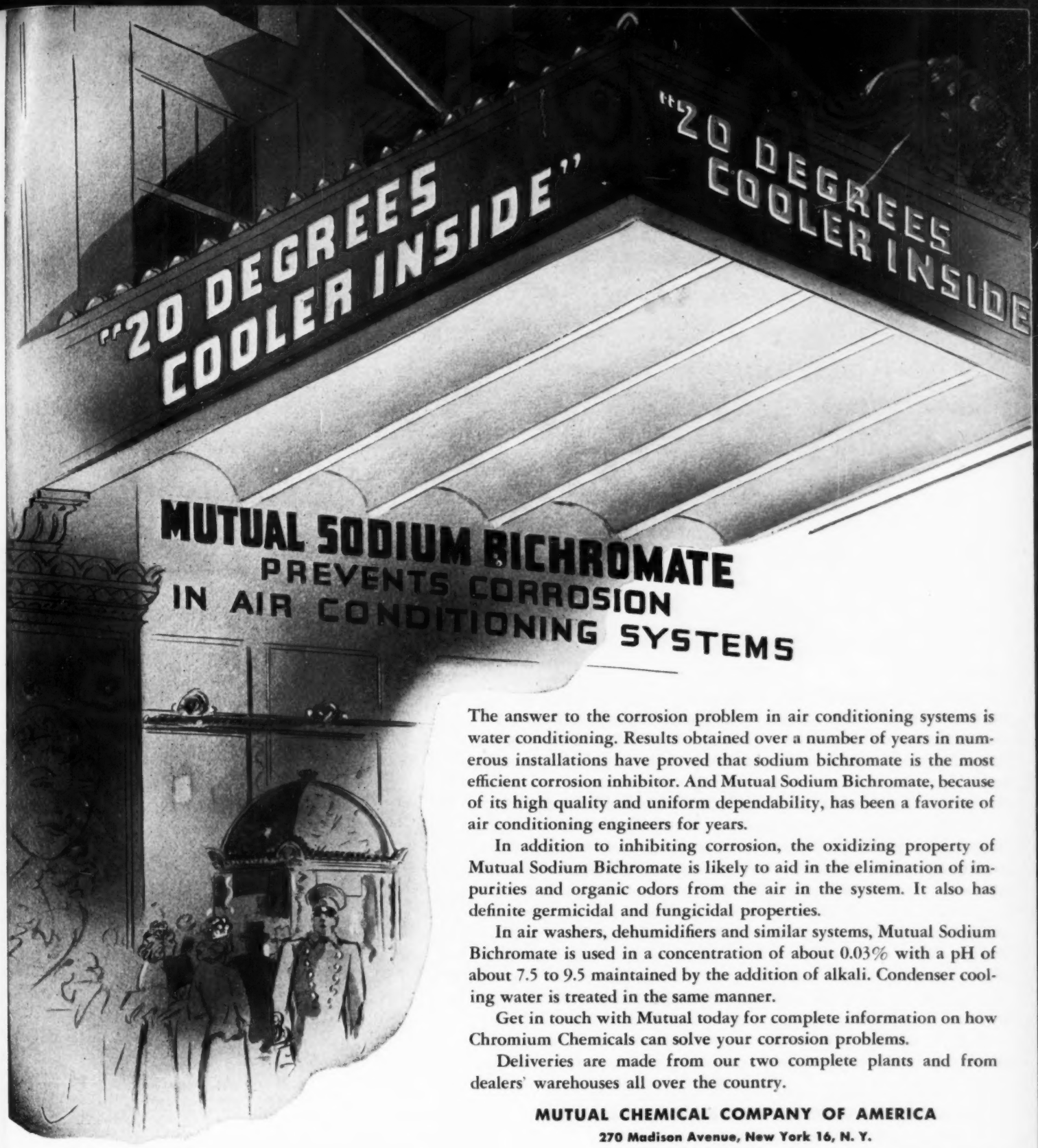

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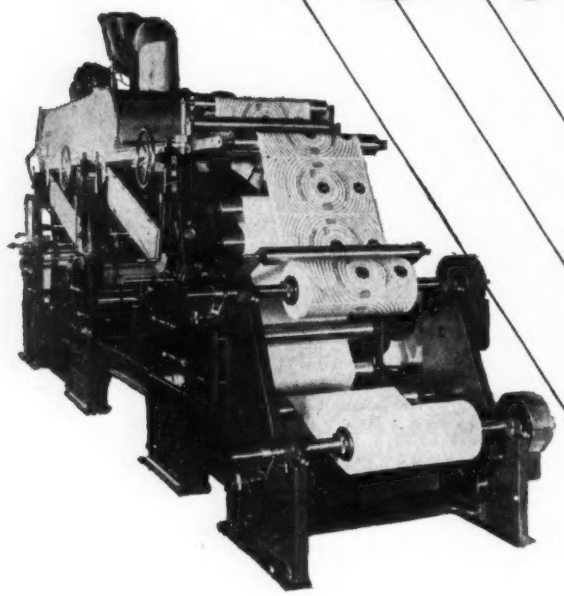

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WASHINGTON

T. N. SANDIFER reporting

Gas Hearings . . . Plant Disposal Policy . . . Coal Tar as Fuel . . . ICC Rate Adjustments . . . Anti-Pollution Bill

Natural Gas Hearings

THE FEDERAL POWER COMMISSION is devoting the final part of its investigation of the natural gas industry to exploring the growing relationship of this industry to synthetic chemicals production.

A considerable part of the remaining six weeks' hearings, which opened in Washington June 17, will be reserved for testimony on prospects for developing various synthetic products, including liquid fuels, and possible revolutionary processes for producing cheap gas fuels from coal.

Warren N. Watson, secretary of the Manufacturing Chemists' Association, was the first industry representative to testify in this concluding series of hearings. He pointed out that the increasing use of natural gas as the base material for synthetics created a field for gas overshadowing its use as a cheap fuel.

Also scheduled to appear were experts from the Bureau of Mines and the Geological Survey, to describe research and other activities relating to natural gas and development of synthetics from both gas and solid fuels.

The question of remaining reserves, which Mr. Watson raised in his statement, will be covered in more detail by members of a committee from the natural gas industry. Witnesses for this committee will go into evidence as to natural gas reserves, conservation, transportation and other matters.

This group also will discuss conservation, synthetics, and atomic energy as a future resource in the industry. There has been a presentation by Hydrocarbon Research, Inc. of possibilities of making synthetic gasoline from natural gas and of making natural gas equivalents from coal. Koppers Company and the National Coal Association also have been recently represented on economic aspects of the investigation.

A major objective of the over-all investigation, in fact, is to determine the competitive position of natural gas in relation to other fuels. One of the issues involves the authority assumed by the Federal Power Commission to deny entry of new natural gas transportation into areas which the FPC considers are already adequately served by other fuels.

The Manufacturing Chemists' Association, and the chemical industry generally, it is understood, are taking no stand in the more controversial fields of the investigation.

The Senate Appropriations Committee has recommended $449,516 for the fiscal year starting July to support a new oil and gas division in the Interior Department, which, as mentioned in earlier issues, may in time either parallel some of the present functions of the Federal Power Commission or may seek to have these functions placed under its jurisdiction.

The expectation is, however, that this new agency will start very cautiously, perhaps gathering statistics and coordinating other Federal activities relating to oil and gas. Some conferences have been held to consider preliminary work.

New War Assets Disposal Policy

A CLOSING DATE OF JULY 30 has been set by War Assets Administration for receipt of offers to purchase or lease the government-owned Big and Little Inch Pipe Lines, which natural gas companies have sought to have converted to piping natural gas into industrial consuming areas, and which use is opposed by Government factions. Bids are to be opened July 31.

In any large properties in which there is an important dispute as to disposal, War Assets appears likely to run into the snarl of obstructive provisions written into the Surplus Property Act. It encountered inter-agency difficulty in attempting to wind up its sale of the Government-owned Geneva, Utah, steel plant to U. S. Steel. The bid was awarded to this private company, but under the law the Department of Justice had 60 days to approve the sale. During this time the least-informed agency in Washington as to the outcome was the War Assets Administration.

It is more than likely that the same situation will develop in the case of any attempted award of the pipe lines, where the opposition is sufficient to make itself heard.

Meanwhile, War Assets Administration has adopted a new plan of establishing a cut-off date after which no further offers for a surplus property will be considered.

Both of these situations—the Department of Justice authority and the policy of cutting off bids at a certain date—lend interest to the recommendation by War Assets to Congress this month for early sale or lease of a part of the wartime synthetic rubber facilities. The recommendation covered the entire butyl rubber capacity of the country, more than 90 per cent of the styrene capacity, 86 per cent of the neoprene, and 8 per cent of carbon black. Ten plants are included in all. Omitted at this time is any recommendation on butadiene and GR-S copolymer plants, pending a further report from the Interagency Committee on rubber.

This report is scheduled to be ready in the near future. On receipt of the recommendations of the Committee, War Assets Administration plans to send to Congress its plan for disposal of all butadiene and copolymerization plants in the GR-S program. The Inter-Agency report will cover measures for assuring a minimum peacetime synthetic rubber industry.

There are some obvious speculative features in this outlook. First is the preoccupation in the present Administration with anti-monopoly aspects of the disposal of all surplus properties. It is conceivable, however, that the new Congress may have an entirely different complexion from the present body. The new Congress, without necessarily tending to feel differently about monopoly than the present body, may have a different approach to disposal problems generally. It may seek to rewrite the Surplus Property law and may eliminate some of the current features of the law.

Government Discourages Burning of Coal Tar as Fuel

DURING THE PAST WINTER it was learned that coal tar producers, particularly steel companies, were burning their own coal tar as fuel, in place of higher-priced No. 6 fuel oil. Coal tar is still classed

as a short commodity, as well as many coal-tar chemicals. Individual companies may now apply for a price on their coal tar which will encourage them to sell it to distillers rather than burn it. However, there is no industry-wide price increase, and an applicant for a price increase must show he is equipped to burn liquid fuel. The OPA took this method rather than issue a flat order against burning coal tar as fuel.

Interstate Commerce Commission Notes

THE I. C. C. HAS SUSPENDED until January 6, 1947, operation of proposed new rail shipping rates on Florida phosphatic sand and clay pending an investigation by the Commission of various matters involved.

Intercoastal rates from Atlantic to Pacific ports under an I. C. C. action just announced provide for a carload rate of 75 cents per 100 pounds, minimum 40,000 pounds, and less-than-carload rate of $1.55, on silica gel or silica gel catalyst, in bags, barrels, or boxes and certain other westbound, intercoastal rates on sienna, umber, and pigment colors as follows: sienna and umber, in packages, 85 cents a 100 pounds, carload, minimum 24,000 pounds, and $1.21 for less than carload quantities.

A rate of 43 cents per 100 pounds has been authorized on shipments of imported vegetable oils from Louisiana, Gulf and South Atlantic ports to midwestern destinations, and the same rate plus 11 cents per 100 pounds from South Florida ports to the same interior destinations.

Anti-Pollution Bill Pushed Forward

THE ANTI-POLLUTION BILL, H. R. 6024, is being pushed in the House and shows signs of getting serious consideration because of the active interest of conservation organizations and similar groups. It contains, among other things, stringent provisions under which such bodies could get local court action against a plant or concern charged with polluting streams with plant waste.

Protest Filed on Steel Drums

THE MANUFACTURING CHEMISTS ASSOCIATION has filed a strong protest with Civilian Production Administration over allocation of drums to the Agriculture Department for shipping corn syrup abroad in food relief. This consignment of steel drums, said to amount to 10,000, will make a serious inroad on drum supplies needed in the next several months by essential chemical shippers, it is pointed out. If the Department insists on taking them, it is feared that an already serious situation, aggravated by the steel shortage, will become worse.

Decontamination Problems

RENDERING SAFE for ordinary occupancy and use the surplus buildings and lands used in wartime for explosives manufacture continues to be a problem at War Assets Administration.

In the case of the Gulf Ordnance Plant. Prairie, Miss., typical of others, a series of recommendations have been made by a War Department Board consisting of department representatives, officials of WAA, and experts from two explosives manufacturing firms.

The Board found that three buildings in each of the two powder loading lines operated at the plant were so contaminated with TNT that they could neither be used in place nor dismantled and reconstructed because of the hazards involved.

The recommendations included destruction of six buildings, which was only about 2 per cent of all structures at the plant, and protective steps in making safe various sumps and sewer lines. These latter have to be demolished, refilled, and any explosive debris removed and burned in open fire.

Corn Promised Starch Makers

FOLLOWING A SERIES OF MEETINGS with Agriculture Department heads, the Civilian Production Administration Chemical Division believes it can promise sufficient corn for starch and other industrial use up to August 1. No formal CPA order is forthcoming, but it is understood the Agriculture Department has agreed to find the corn.

Synthetic Fuel Funds Cut Disapproved by Senate

WHILE THE INTERIOR DEPARTMENT appropriation must still pass the Senate, the House bill virtually eliminated funds for synthetic liquid fuel development and helium utilization research, as reported by the committee.

The House committee in charge of the bill allowed $75,000 for lignite and subbituminous coal investigations under the Bureau of Mines out of $150,000 increased funds requested.

However, the Senate Appropriations Committee this month restored the Bureau of Mines appropriation to the full $7,000,000, which will provide for continuation of activities in synthetic fuel development. The House cut was mentioned, because when the Senate completes action on the bill, the differences between House and Senate provisions will have to be ironed out by conferees, and there is still a chance of some adverse compromise.

CALCIUM ARSENATE SUPPLIES available to cotton growers this year will meet less than 70 per cent of basic needs, according to the USDA.

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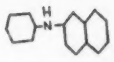

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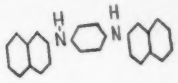
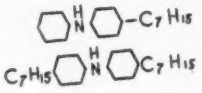
Purity 98.0%

Di B Naphthyl p Phenylene Diamine



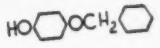
Available in commercial quantities
M. P. 230° C
Purity 98%

Mixed Mono-and Diheptyl Diphenyl Amines



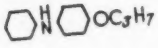
Available in commercial quantities
Distillation range—145-245
(3.0 mm)
Purity 98%

Monobenzyl Ether of Hydroquinone



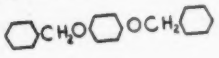
Available in commercial quantities
M. P. 113°
Purity 90%

Isopropoxy Diphenyl Amine



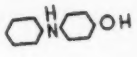
Available in commercial quantities
M. P. 78°
Purity 92% min.

Dibenzyl Ether of Hydroquinone



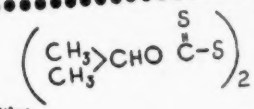
Available in Pilot Plant quantities
M. P. 119°
Purity 85%

p Hydroxy Diphenyl Amine



Available in commercial quantities
M. P. 150
Purity 92%

Di Isopropyl Dixanthogen

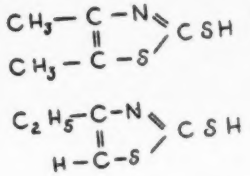


Available in commercial quantities
M. P. 52°
Purity 98%

N-Nitroso Diphenyl Amine

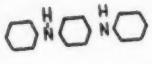
Available in commercial quantities
M. P. 62°
Purity 97%

Mixed Ethyl and Dimethyl Mercaptothiazoles



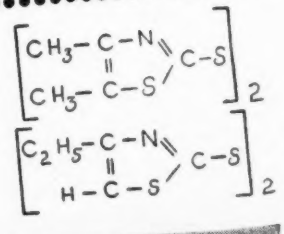
Available in commercial quantities
M. P. 136-153°
Purity Approximately 85% dimethyl and 15% ethyl mercaptothiazoles

Diphenyl p Phenylene Diamine



Available in commercial quantities
M. P. 144°
Purity 92%

Mixed Aliphatic Thiazyl Disulfides



Available in commercial quantities
Liquid

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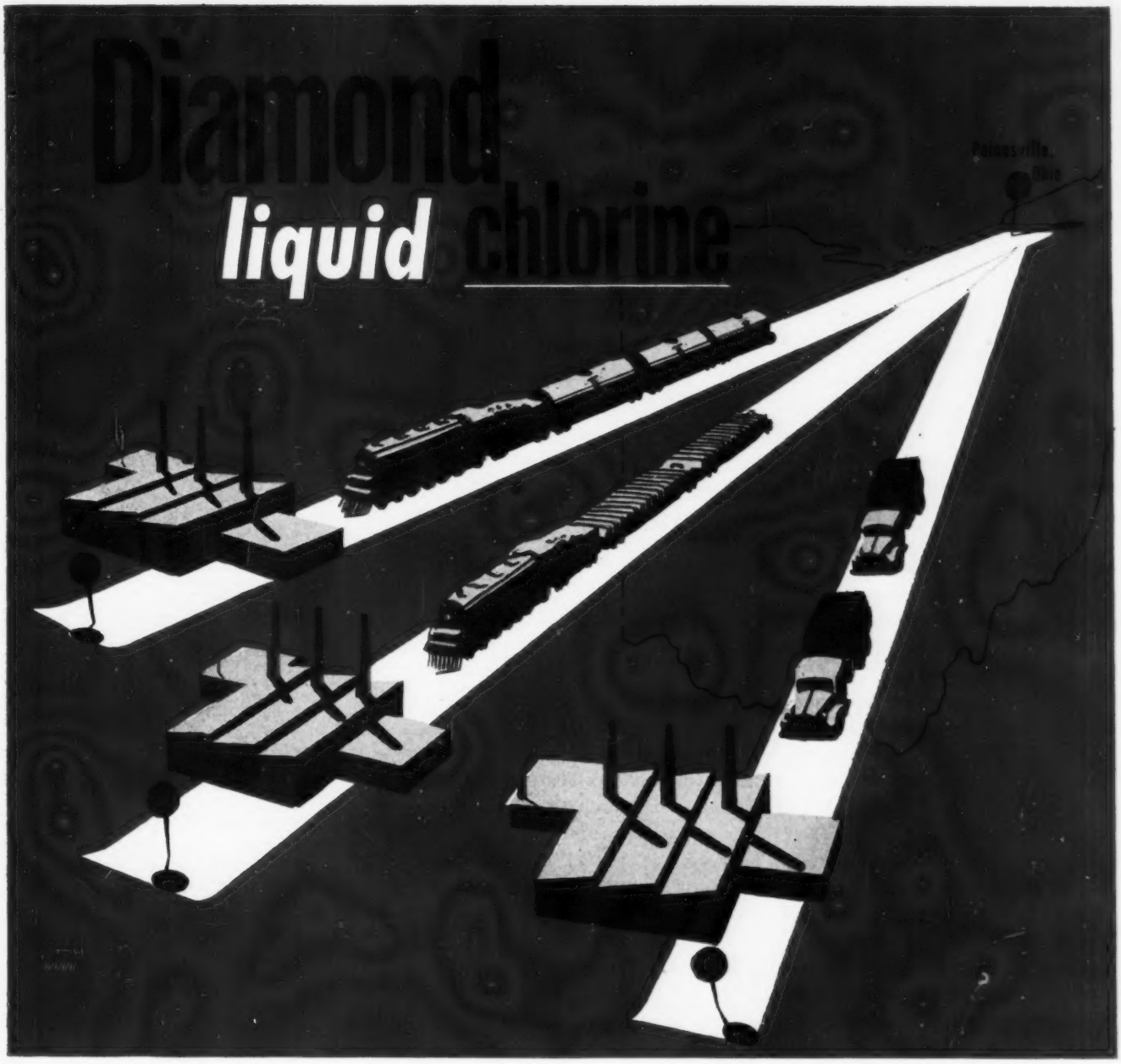

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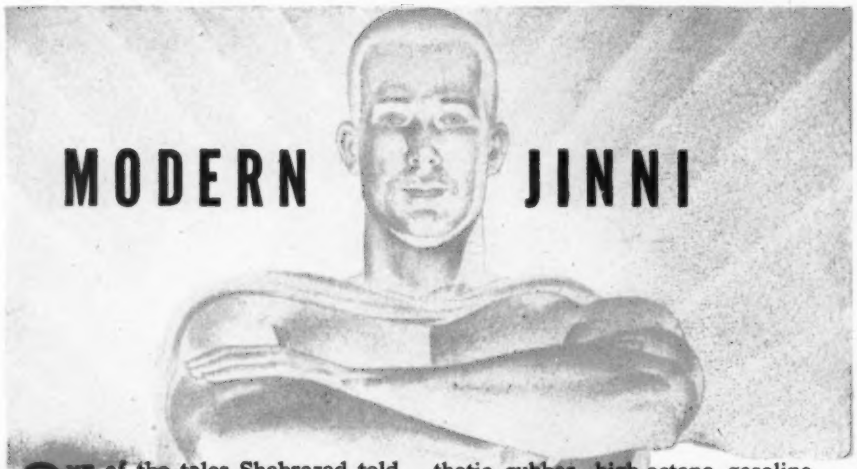

ONE of the tales Shahrazad told her King, during her thousand and one Arabian Nights, was the story of the jinni, sealed in a bottle, who came out at his master's bidding to expand to gigantic size and perform miracles.

Sealed for delivery in a 26-ton tank car, 1,349 cubic feet of liquid Anhydrous Ammonia will, upon release from its steel bottle, make 1,144,000 cubic feet of Ammonia gas. Used as a liquid, or as a gas, or as a basic chemical from which other products are made, Ammonia performs miracles beyond the dreams of Shahrazad.

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ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Barrett

The Reader Writes

(Continued from page 4)

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JOHN C. DEAN
Process Products Division
Socony-Vacuum Oil Company
New York 4, N. Y.

Master Index

To the Editor of Chemical Industries:

Your magazine CHEMICAL INDUSTRIES has proven very helpful to us in establishing a reference library for our laboratory. We have nearly every issue since 1940, and use them often in our research and related problems. It will soon be used as a part of a training program which we are now organizing.

In cataloging the subject matter of these magazines, it occurred to me that a master index would be very useful. If you publish such an index and have one available, I would appreciate your sending it to me.

W. E. FALLS
Standard Varnish Works
Chicago, Illinois

CHEMICAL INDUSTRIES *does not publish a master index of its articles. However, its contents are indexed in the well known reference periodical "Industrial Arts Index" which is published in monthly and also in cumulative annual volumes by H. W. Wilson Co., New York.*—EDITOR.

Popular Articles

To the Editor of Chemical Industries:

We have noted with interest two articles that have appeared in recent issues of CHEMICAL INDUSTRIES.

The first is "Intelligent Handling of Complaints Will Sell More Chemicals," which appeared in the January issue, and the second is "How Chemicals Aid in Revolutionary Precision Casting Process," which was in the April issue.

We would like to obtain about 250 copies of each article.

H. W. MCKENNA
Carbide and Carbon Chemicals Corp.
New York, N. Y.

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Reg. U. S. Pat. Off.

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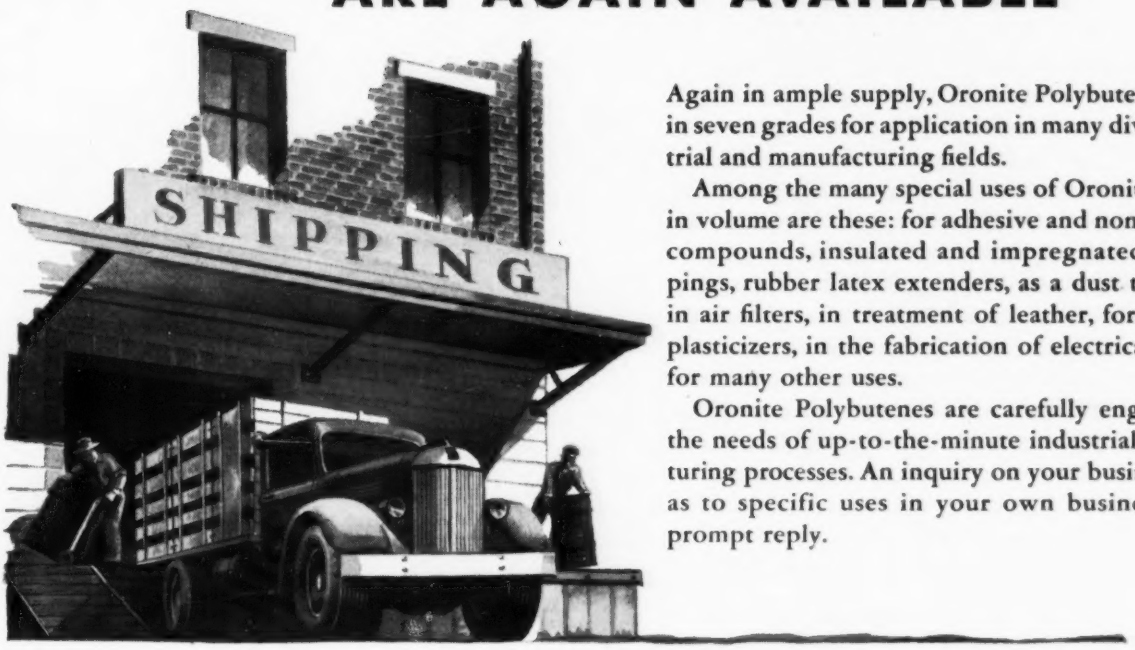

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Flash Point, Clev.°F.	315	340	360	380	435	500	540
Viscosity 100°F. SSU	358	3390	5425	17160	49750	167500	347600
Viscosity 210°F. SSU	52	154	210	528	1060	3065	6075
Viscosity Index	71	75	80	100	104	115	119
Pour Point °F.	—30	—5	0	10	20	40	55
Solid Point °F.	—35	—10	—5	5	15	35	50
Gravity, API	35.4	32.0	31.0	29.8	27.9	26.0	25.0
Spec. Gravity	.8478	.8654	.8708	.8772	.8877	.8984	.9042
Lbs. Per Gallon	7.059	7.206	7.251	7.305	7.392	7.481	7.529
Molecular Weight	370	530	600	700	900	1200	1500
Neut. Number	.10	.10	.10	.05	.02	.01	.01
Sap. Number	.3	.3	.2	.2	.2	.1	.1
Carbon %	0	0	0	0	0	.01	.02
Sulphur %	.01	.01	.01	.02	.02	.02	.04
Sligh Oxidation Test	0	0	0	0	1	1	2
Color ASTM (Max.)	1½	1½	1½	2	2	2	2
Dielectric Strength	35,000	35,000	35,000	35,000	35,000	35,000	35,000

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Arofene 700
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SPECIFICATIONS

AROFENE 700

Acid Number:	70-85*
Melting Point (Mercury Method):	75-85°C.*
Color:	Paler than WW Rosin
Specific Gravity:	1.1
Solubility:	Complete in all hydrocarbons, usual varnish and lacquer solvents and varnish oils.

*Since this resin is heat reactive, these values are unimportant because in the cooking operation they change completely with the formation of a new chemical compound of which the oil is a part.

AROFENE 775

Melting Point: (Mercury)	121-138°C.
Color of 50% solution of Acetone (GH 1933):	Less than 10
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Volatile (at 560°F. for 15 min.):	Less than 5%
Ash Content:	Less than 0.2%

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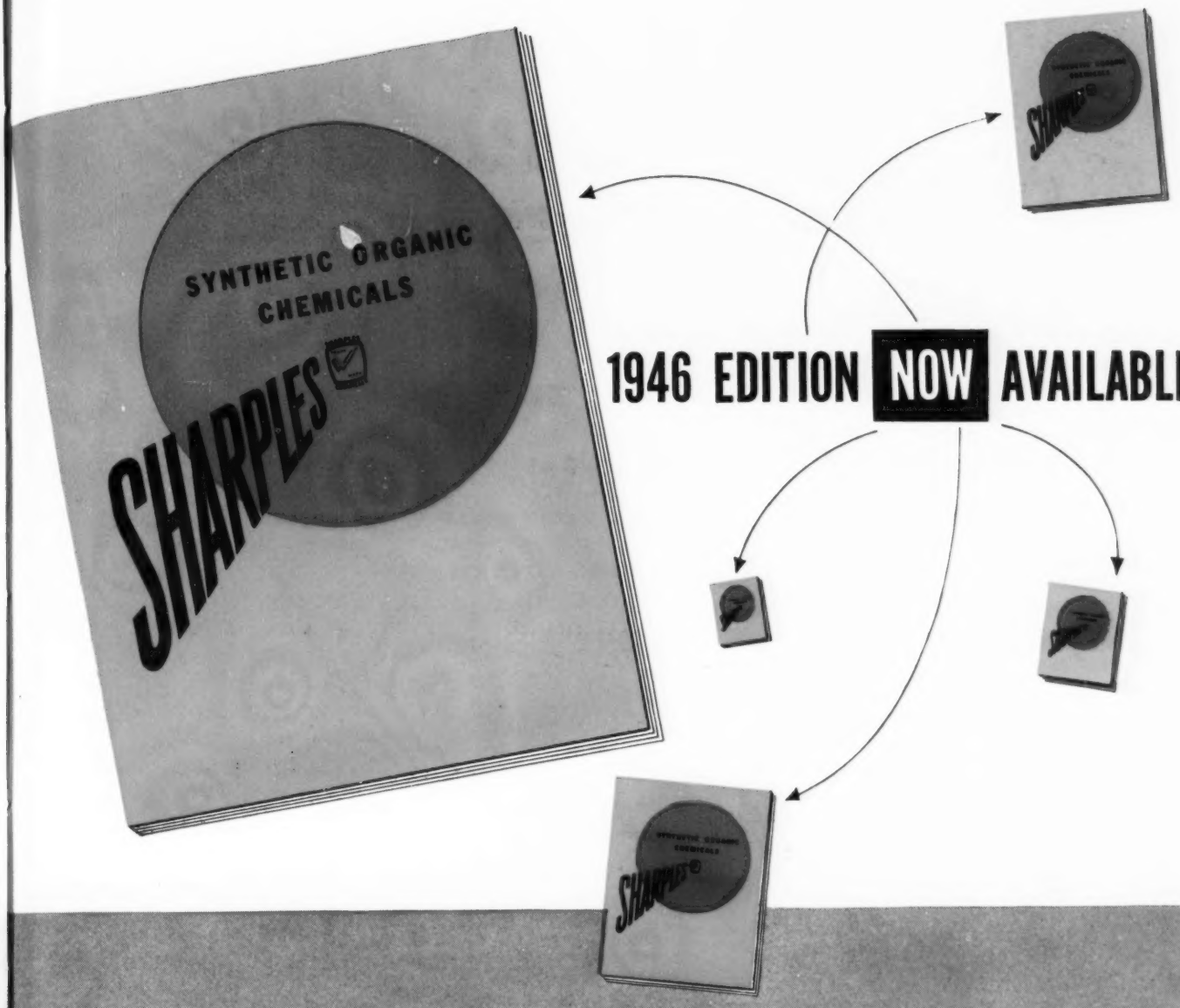

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ETHYLDIETHANOLAMINE
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Other Sodium Salts	2.0% Max.
Iron	8ppm Max.
All other metals	1ppm Max.
Water of Crystallization	36.5 to 34.5%

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Sodium Sulfide	1 to 2%
Sodium Chloride	1% Max.
Other Sodium Salts	1% Max.
Iron	5ppm Max.
All othe metals	1ppm Max.
Water of crystallization	28 to 26%

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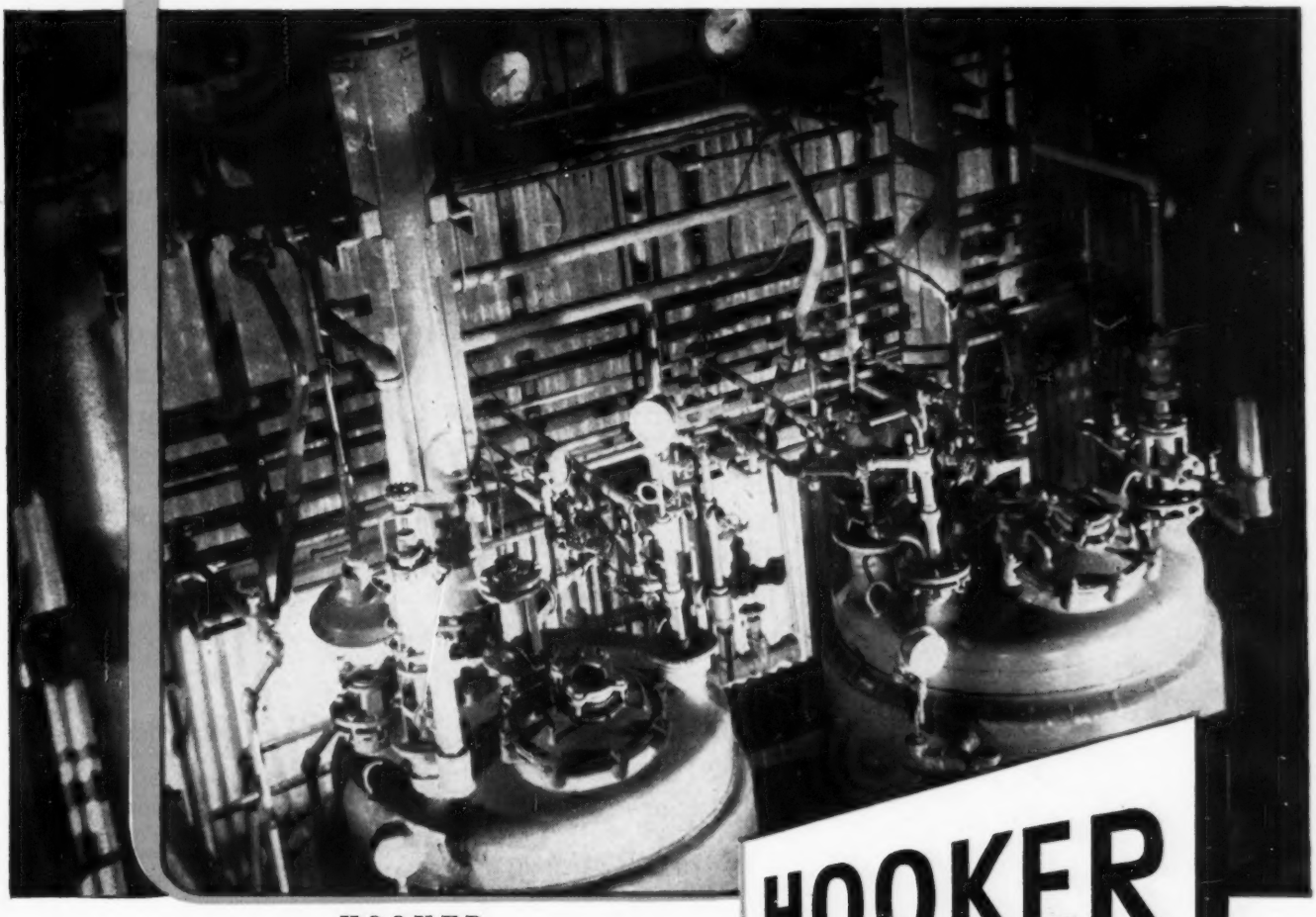

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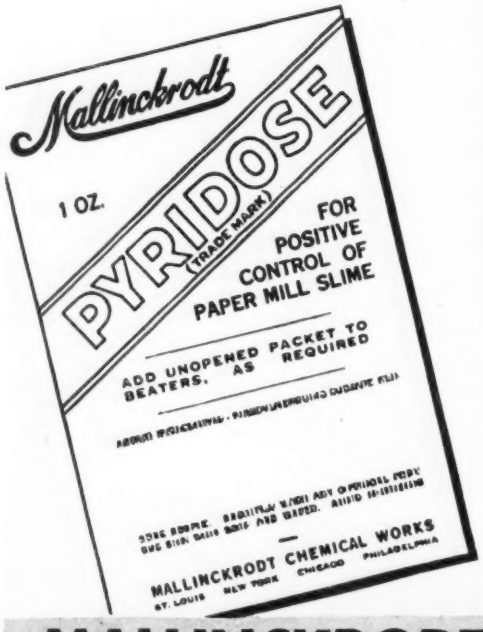

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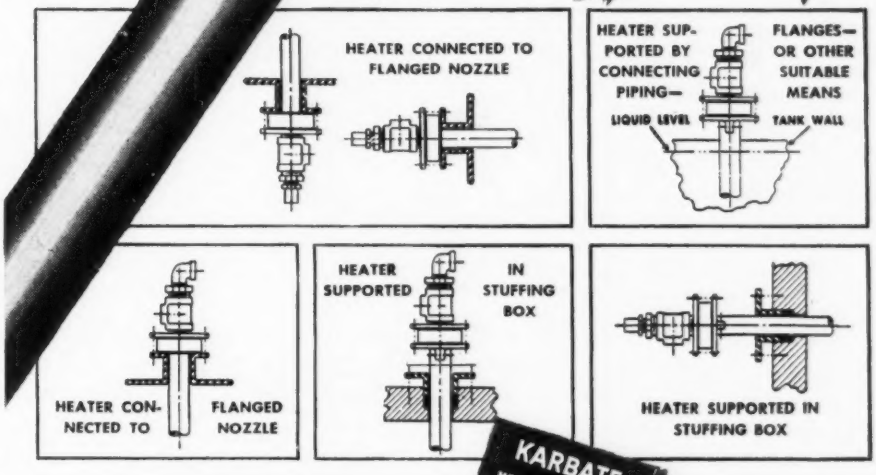
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For more details of the "Karbate" Bayonet and the Plate-Type Heaters, send for Catalog Section M-8804.

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Unit of Union Carbide and Carbon Corporation

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UCC

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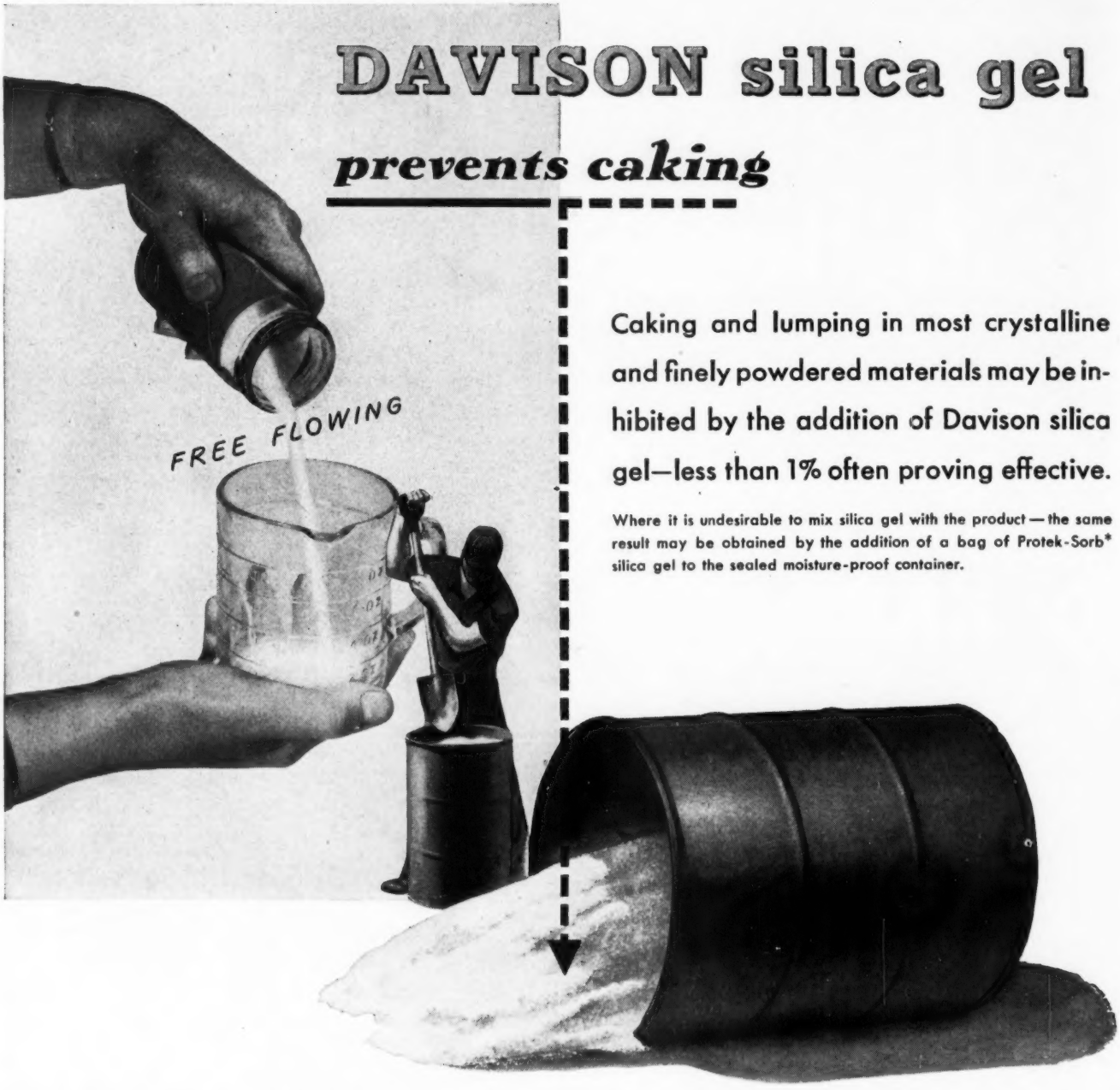
Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

DAVISON silica gel

prevents caking



Caking and lumping in most crystalline and finely powdered materials may be inhibited by the addition of Davison silica gel—less than 1% often proving effective.

Where it is undesirable to mix silica gel with the product—the same result may be obtained by the addition of a bag of Protek-Sorb* silica gel to the sealed moisture-proof container.

Where caking and lumping are caused by moisture forming a film of saturated solution around individual particles, causing them to adhere, Davison silica gel in most instances will take up this moisture in contact with the material (in a sealed moisture-proof container) and present a dry, free-flowing product to the consumer.

Davison silica gel is chemically inert to the ordinary acids and their salts—and is non-toxic. It cannot, however, be used with strong alkalies and should not be used mixed with the product where a slight turbidity (harmless) is undesirable in the resulting solution.

Caking and lumping make up a vexing problem in many fields—from bulk chemicals in drums to packaged foods, pharmaceuticals and cosmetic powders.

Caking and lumping not only make some products unattractive to the eye but are time wasters in that material must be dug out of containers . . . it is also difficult to weigh or measure caked material. A free-flowing powder is often required in order to accomplish packaging with automatic machinery. Consult the Davison technical staff, which is at your service, for problems in this field.

*Reg. U. S. Pat. Off.

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Progress through Chemistry

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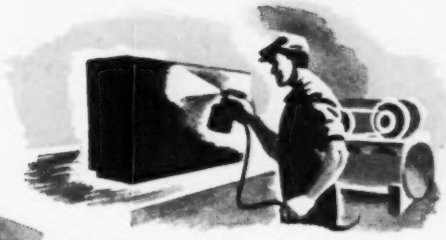
USE A

KETONE



With Nitrocellulose Lacquers. Active solvent portion of lacquers can be completely formulated with Shell Chemical Ketones. Lacquers have proper evaporation rate, good blush resistance, high solids, low viscosity.

Shell Chemical Ketones possess a sufficient variety of characteristics to meet almost any solvent requirement of the surface coating industry. Likewise they offer a wide range of selection for other process industries.

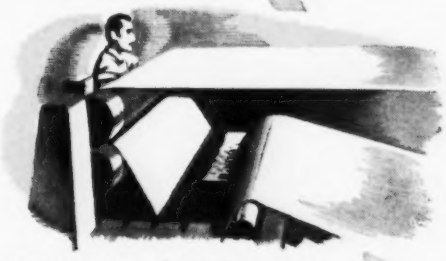
METHYL ETHYL KETONE — a low-boiling, fast-evaporating, rapid-cutting solvent, which does not hydrolyze.

METHYL ISOBUTYL KETONE — characterized by good blush resistance and solvent power, medium boiling point, no hydrolytic reaction during storage.

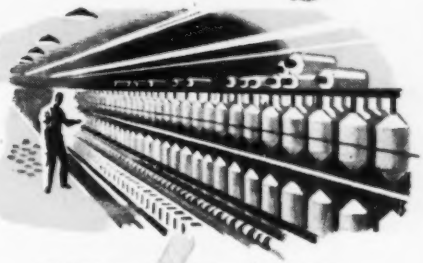
MESITYL OXIDE—higher solvent power than saturated Ketones of similar molecular weight because of double bond between two carbon atoms.

ACETONE — of all Ketones, highest dilution ratio with toluene . . . most rapid evaporating . . . lowest viscosity with nitrocellulose solutions at given concentration.

DIACETONE ALCOHOL — an active, high-boiling solvent. Improves blush resistance and flow-out. Miscible in all proportions with water . . . most organic solvents.

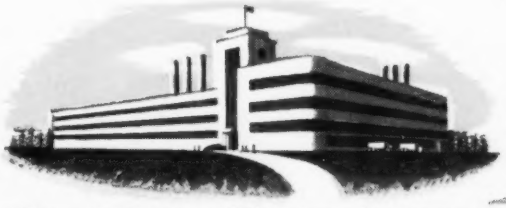


Vinyl Resins. Acetone, MEK, MIBK and Mesityl Oxide have excellent solvent power for vinyl type resins . . . produce high-solids solutions which do not gel.



Cellulose Acetate. Acetone aids in preparation of spinning solutions for rayon. Diacetone contributes blush resistance to lacquers and thinners.

Syntheses. MEK undergoes chlorination, oxidation, and condensation with aliphatic and aromatic compounds. Acetone can be used as a raw material, either as medium of reaction or reacting substance.



Other Formulations. Diacetone is successfully used in hydraulic brake fluids . . . Acetone and MEK as wax precipitants . . . MEK in making cements based on vinyl resins and acrylonitrile types of synthetic rubber.

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LIFE...ON THE

WET STRENGTH PAPER MADE WITH PAREZ* RESIN 607 AIDS FROZEN FOOD LOCKER INDUSTRY

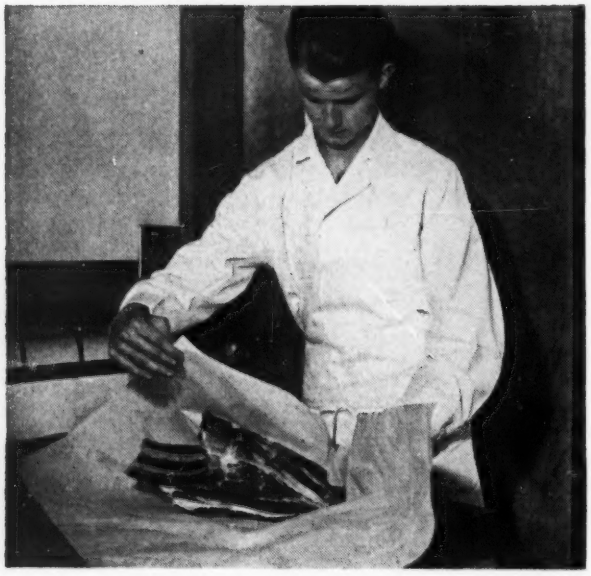
A big factor in the growth of the frozen food locker industry has been the development of a satisfactory wet strength locker paper. Use of wet strength paper makes it possible for locker operators to strip meats of their wrappers in one piece instead of scraping many separate pieces of paper when non-wet-strength paper tears. Also, with home quick freeze units, wet strength paper wrappers will withstand repeated handling without failure.

Many durably efficient types of locker paper are now being made with Cyanamid's melamine paper resin, PAREZ Resin 607, which imparts this necessary and invaluable wet strength. PAREZ Resin 607 also provides improved dry strength and fold endurance. Paper stocks can be produced by simply adding PAREZ Resin 607 in the regular paper manufacturing process.

We shall be glad to work with paper manufacturers who are interested in the production of wet strength paper for frozen food lockers or other uses, and to assist in mill trials of PAREZ Resin 607.

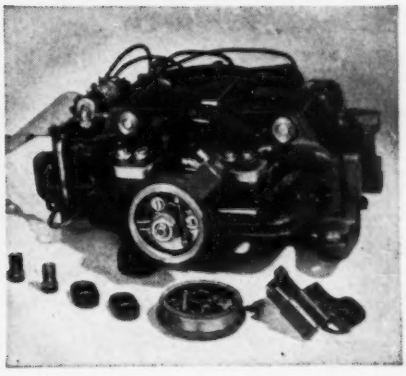
•

(*Left*) **FOR HOME QUICK FREEZE LOCKER UNITS,** where it is common practice for the user to thaw, unwrap, remove portions of meat, fruit, or vegetables, rewrap remainder, and replace package in the freezing unit, wet strength PAREZ Resin-treated paper wrappers will withstand such handling without failure.

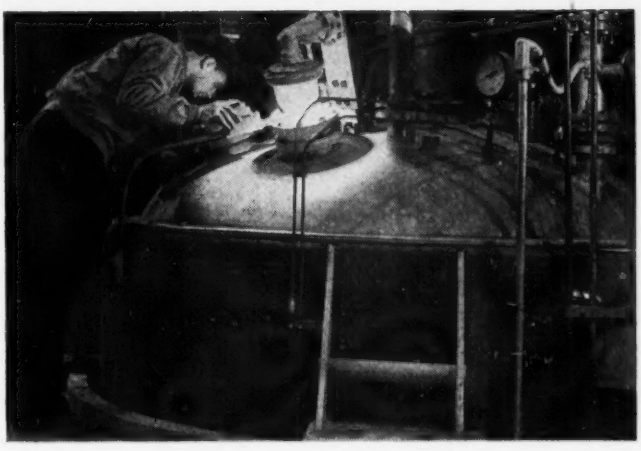


(*Left and above*) **IN COMMERCIAL FROZEN FOOD LOCKERS** wet strength paper made with PAREZ Resin 607 saves time and trouble since it can be stripped off the food without tearing. Based on the present average of users per plant, it is estimated that within a few years there will be 25,000 plants and 11,000,000 lockers in use, serving 38,000,000 individuals.

CHEMICAL NEWSFRONT



(Left and above) **INSULATION PARTS** made of MELMAC* plastic, product of Cyanamid's Plastics Division, are now being installed on motors of electrically operated National Cash Register machines to eliminate costly repairs and involved service charges, and are being used as replacements for breakdowns in the field. Tests show that MELMAC parts operate more dependably than those formerly used. Because of high arc resistance and good insulating properties they do not break down under arcing caused by dust and oil.



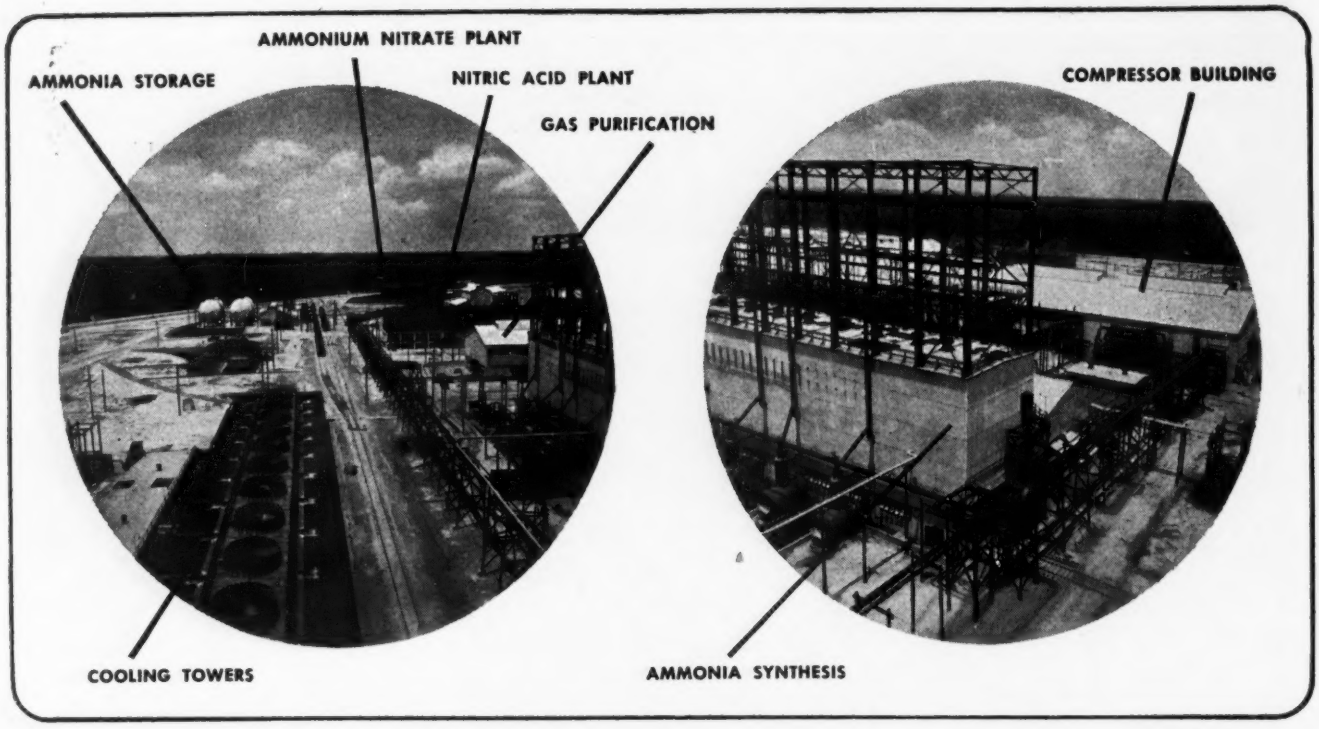
(Above) **AN IMPROVED CHEMICAL PLASTICIZER** for processing of GR-S (above left), natural rubber (above right), and mixtures of the two, has now been developed by Cyanamid. PEPTON** 22 Plasticizer, a non-staining, non-toxic peptizer is the result of years of research to solve the problem of obtaining desired plasticity in rubber compositions. Large-scale commercial production of PEPTON 22 is now under way, in the meantime pilot plant quantities are available for experimental purposes. A copy of our new 56-page technical bulletin will be sent on request.

*Reg. U. S. Pat. Off. **Trade-mark

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.



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CHEMICO offers a COMPLETE plant . . . all the necessary equipment and structures for the production and purification of the required hydrogen and nitrogen and their synthesis to form ammonia, together with all the necessary auxiliaries such as storage facilities, ammonia gas recovery systems, power producing facilities, and water distribution systems.

One contract . . . a single responsibility . . . and an overall guarantee of performance . . . all based on the most extensive specialized experience in the field of synthetic ammonia production . . . these are your assurances of complete satisfaction when you come to CHEMICO. Full information on the details and many exclusive benefits of the N.E.C. Process will be sent on request . . . without obligating you in any way.

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European Technical Repr.: Cyanamid Products, Ltd., Berkhamsted, Herts., England

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NEO-FAT 11 = $C_{12}H_{24}O_2$ Lauric Acid
NEO-FAT 13 = $C_{14}H_{28}O_2$ Myristic Acid
NEO-FAT 1-56 = $C_{16}H_{32}O_2$ Palmitic Acid
NEO-FAT 1-65 = $C_{18}H_{36}O_2$ Stearic Adid

Other Fractionated Fatty Acids

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May we recommend the Neo-Fat or derivative best suited to your particular needs?

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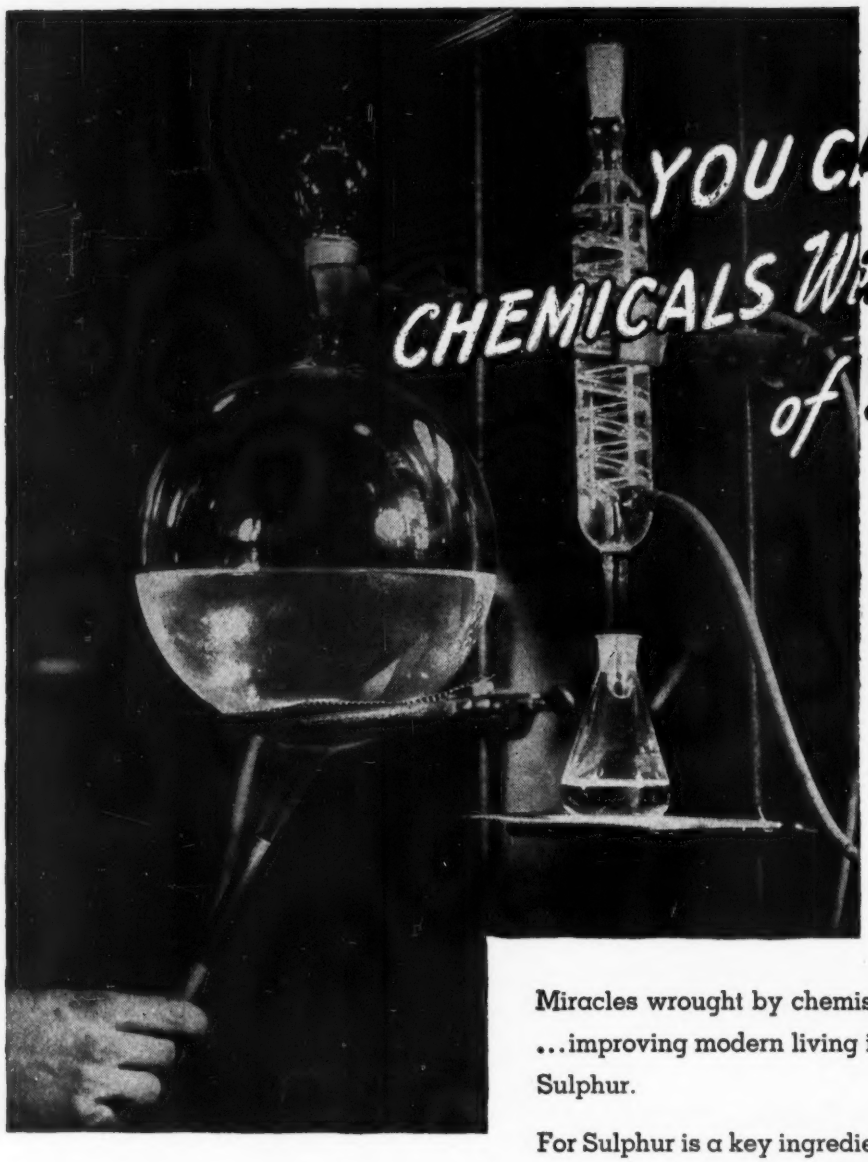

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Miracles wrought by chemistry...ideas born in test tubes ...improving modern living in many ways...owe much to Sulphur.

For Sulphur is a key ingredient in countless chemicals that produce the miracles. Its principal derivative, Sulphuric Acid, is one of the cheapest and most versatile of all the chemist's tools. Carbon Bisulphide, Sulphur Dioxide and other Sulphur chemicals also play major roles in the chemical industry.

Freeport Sulphur Company has a supply on hand sufficient to meet all anticipated demands. In addition to this, underground reserves plus efficient mining methods give assurance of a steadily continuing supply.

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FILM	REFINED METALS
FOOD PRESERVATIVES	REFRIGERANTS
FUMIGANTS	RESINS
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GASOLINE	SYNTHETIC RUBBER
GLASS	SOAP
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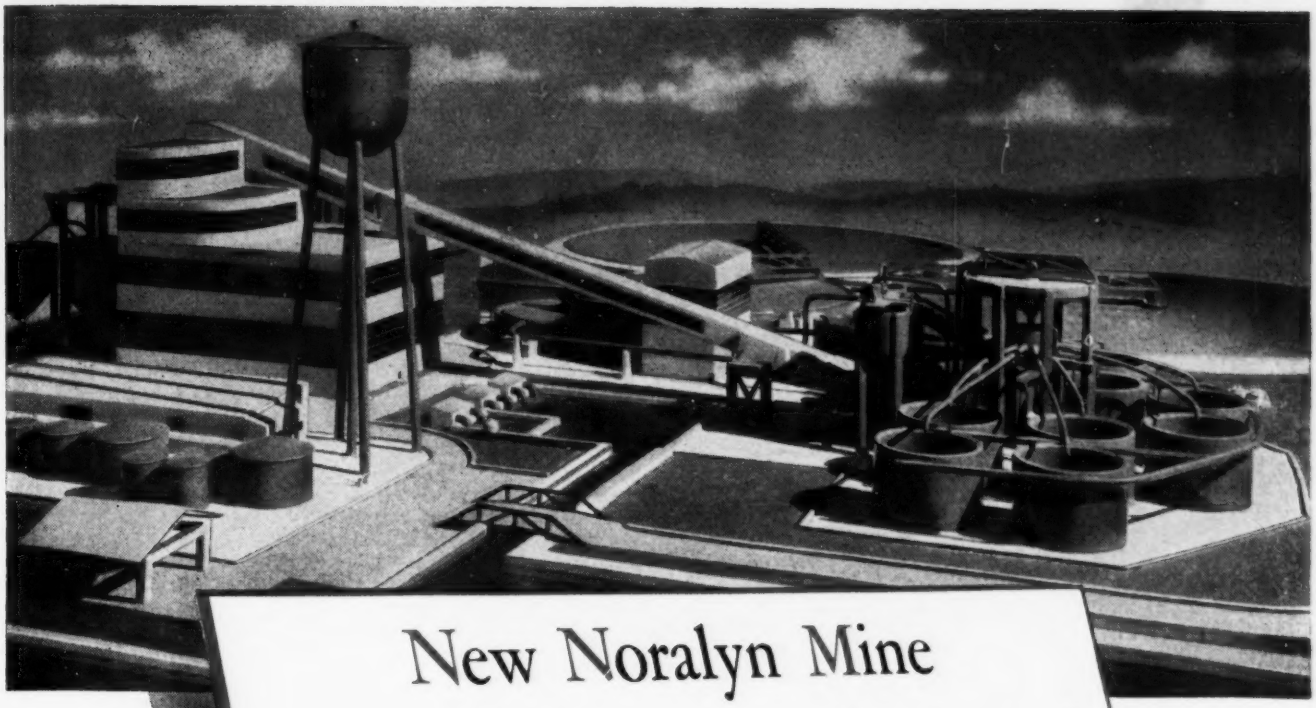
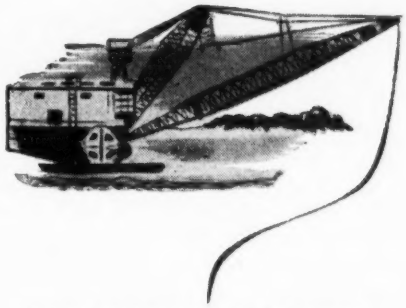


New Noralyn Mine to expand annual production of International Phosphate Rock



ALL COMMERCIAL GRADES

Florida Pebble Phosphate

and

Tennessee Phosphate Rock

TO MEET FUTURE world-wide requirements for industrial and agricultural Phosphates, International is building the largest and most modern Phosphate Rock Mine in America . . . the NORALYN MINE near Bartow, Florida.

In capacity, metallurgical innovations and quality of Phosphate Rock to be produced, the NORALYN MINE will be unique in the history of the industry. When it begins operation in 1947, the production of International's mines in Florida will be greatly expanded.

As the largest producer in America, International has pioneered for thirty-six years in the development of improved processes for mining and refining Phosphate Rock. With the completion of its present building program, International will be well prepared to supply a greatly increased tonnage of essential Phosphates for industry and agriculture, at home and abroad, in the years that lie ahead.

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You associate sanitation with a grocery, and that's largely because of glass. Think of a market without glass showcases . . . glass containers for food products . . . glass bottles for liquids!

Many surprising new uses for glass are being developed, too. It is being used for draperies . . . awnings . . . insulation . . . fixtures and appliances for the modern home.

Essential to the manufacture of glass is *Soda Ash*. And a large part of the huge quantity of this valuable chemical used by the glass industry comes from Wyandotte Chemicals Corporation.

Wyandotte Soda Ash is also used in the making of pulp and paper . . . soap . . . non-ferrous metals . . . textiles . . . chemicals.

The result is a busy present—and the prospect of a busier future—in the production of Soda Ash at Wyandotte.

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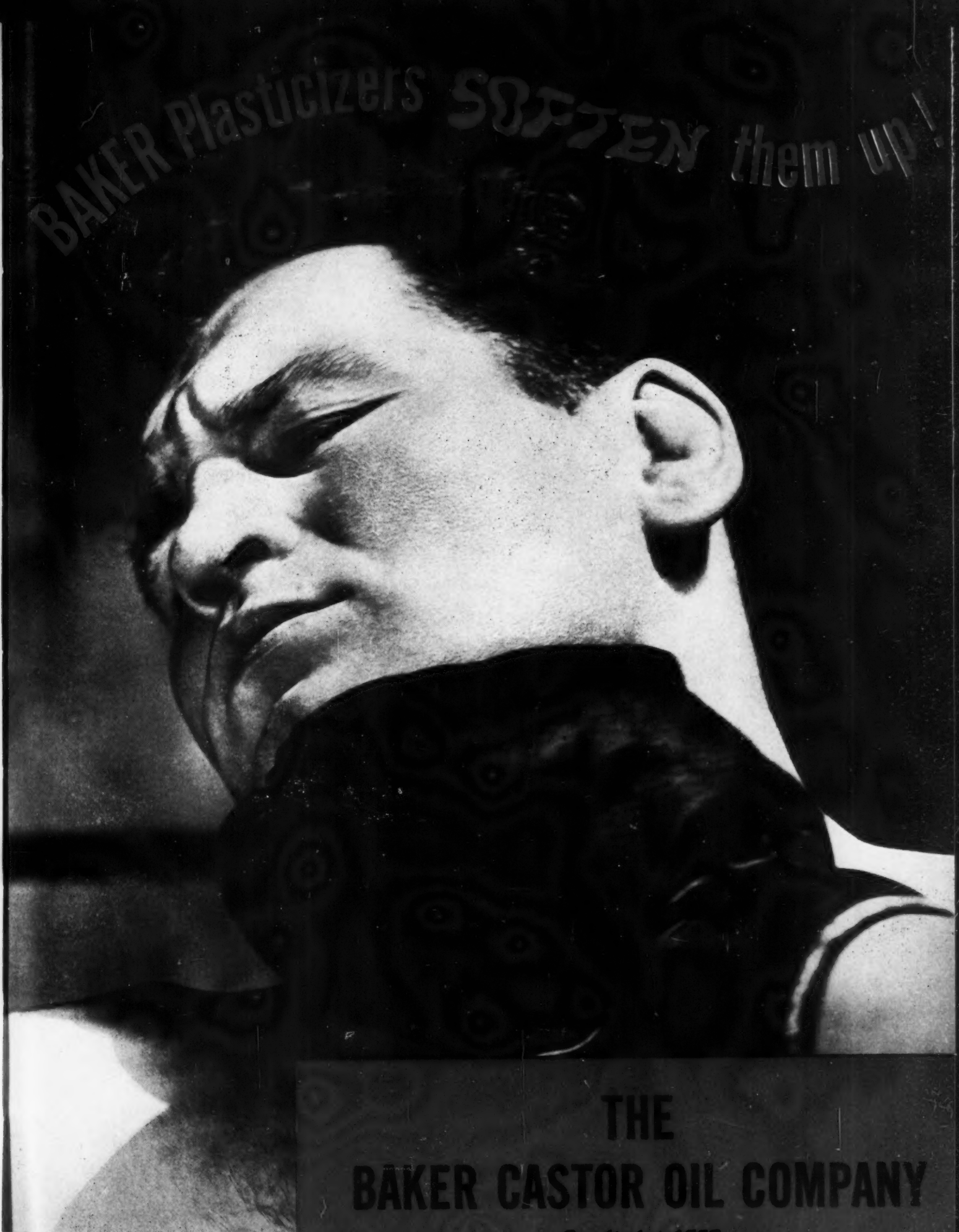

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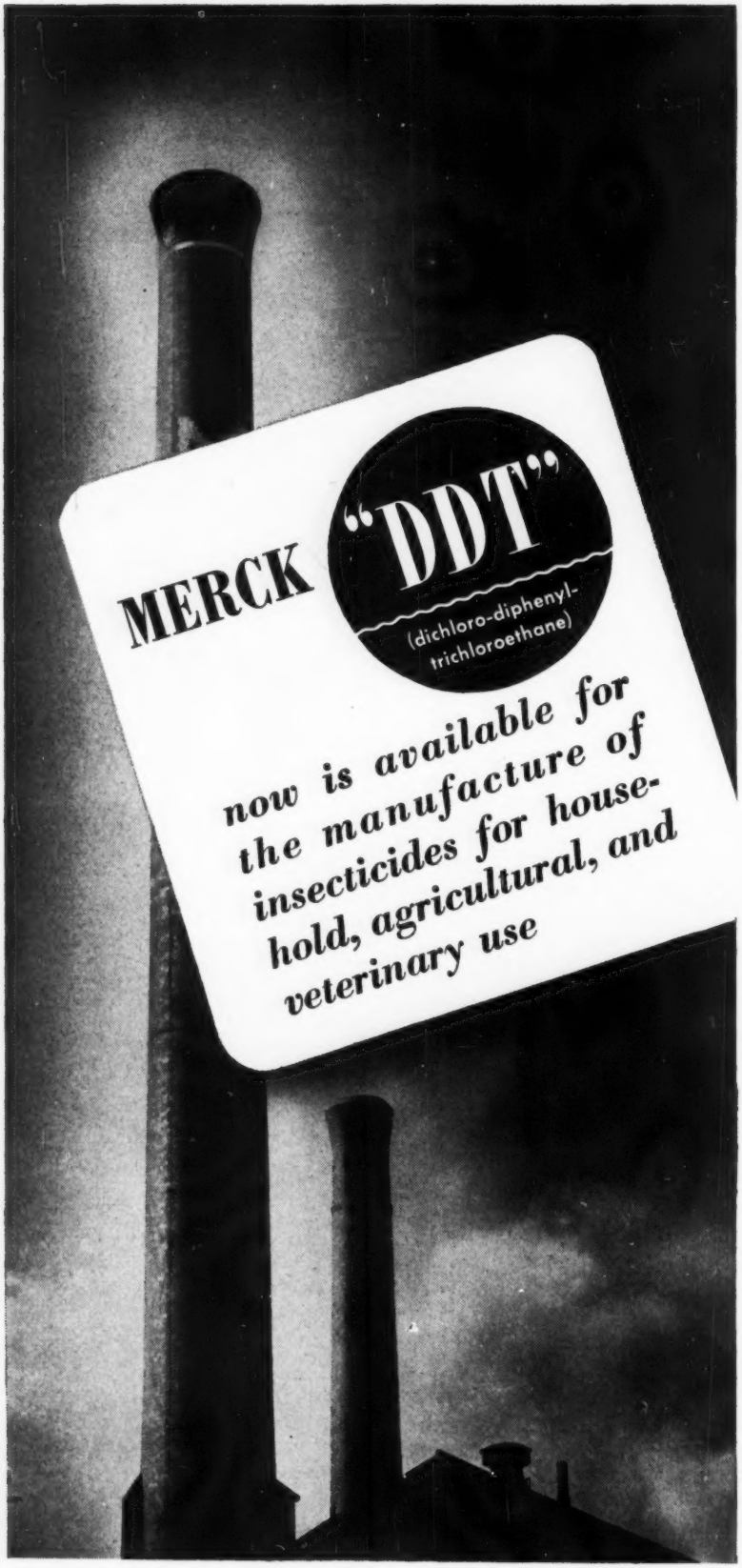
MERCK "DDT"
(dichloro-diphenyl-trichloroethane)
now is available for the manufacture of insecticides for household, agricultural, and veterinary use

NOW that its job of protecting the health of American Service men overseas is almost completed, Merck "DDT" Technical is being released to manufacturers for the production of modern, effective insecticides.

Expanding application defines more definitely the important rôle, present and future, of "DDT" in the hands of the insecticide manufacturer and pest-control operator. For many years, Merck has been producing the pivotal basic chemical employed in the synthesis of "DDT" and thus it was only natural that we should be at the forefront in the production of this powerful insecticidal agent.

The product we are offering is—

"DDT"

(*dichloro-diphenyl-trichloroethane*)

TECHNICAL

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For Manufacturing Purposes Only

As production levels rise and current commitments are provided for, we will find increasing opportunities to co-operate with manufacturers of "DDT" insecticides and to serve as a basic and prime source of supply for this product.

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with 64 years' experience making special chemicals

—B&A may have the answer to your problems

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Such experience can be invaluable to you, too, if your research, development or production program indicates a special chemical will be needed.

Whether you must have this material "made to order" in tons or pounds, you will find B&A's flexible manufacturing facilities well adapted to countless assignments . . . and your special chemical will be produced with the same skill, science and careful attention that has gained B&A the reputation for "setting the pace in chemical purity" wherever reagents and fine chemicals are used.

Remember—no matter what your needs, the Baker & Adamson Division of General Chemical Company has the men, methods, and materials to handle special chemical requirements swiftly, surely . . . and in strictest confidence.

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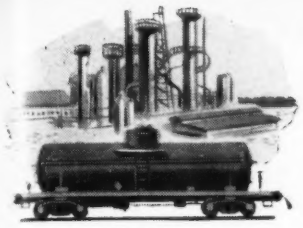

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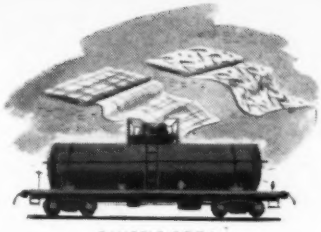
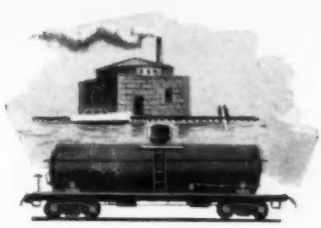
Clean, steel car, 6,000 to 10,000 gallon capacity.



CAUSTIC SODA

Heavily insulated steel car, with or without heater coils, 8,000 or 10,000 gallon capacity. Usually specially lined.



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Insulated, welded car; built to withstand pressure up to 500 pounds; 15 or 30 ton capacity.

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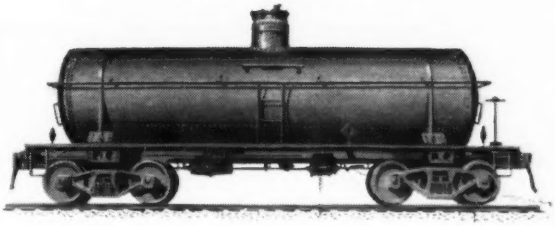
Clean, steam coiled car of 8,000 gallon capacity.

FOR RENT

TANK CARS



Tank car transportation of liquids in bulk, pioneered by General American has proved its versatility, its efficiency, its economy.

The General American fleet comprises more than 37,000 specialized tank cars . . . 207 different types of tank cars . . . designed for the safe and swift hauling of an almost infinite variety of liquids.

General American's strategically located offices, plants, and repair shops keep these tank cars at your service; provide you with precisely the type of tank cars you want, *when* you want them, *where* you want them.

If your problem is the transportation of liquids in bulk, let the nearest General American office help you.

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GENERAL OFFICE: 135 South La Salle Street • Chicago, Illinois

DISTRICT OFFICES:

New York • St. Louis • Buffalo • Seattle • Los Angeles • Dallas • Houston
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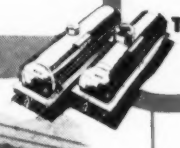
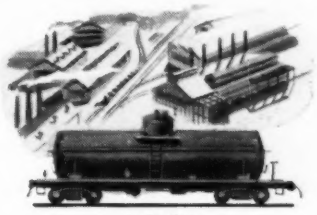
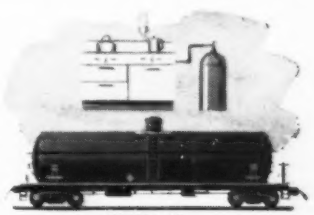


GENERAL AMERICAN TRANSPORTATION CORPORATION
CHICAGO



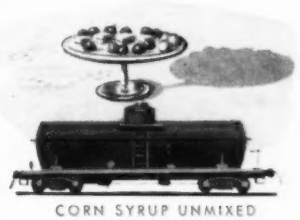
FUEL OIL

Steel car, steam coiled, 8,000 to 12,500 gallon capacity.



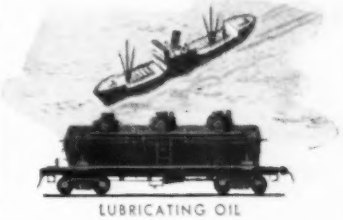
PROPANE

Heavily constructed car, welded and insulated. Built to withstand internal pressures to 300 pounds. Capacity 10,000 to 11,000 gallons.



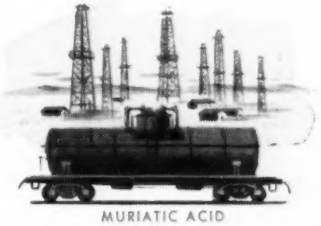
CORN SYRUP UNMIXED

Clean, steam coiled with heavy truck capacity. Usually lined with aluminum paint.



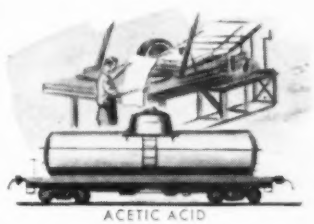
LUBRICATING OIL

Steel car, with steam coils, single or multiple compartment; usually 8,000 gallon capacity.



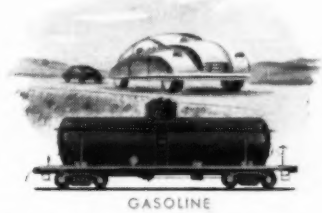
MURIATIC ACID

Car lined with pure or synthetic rubber; 8,000 to 10,000 gallon capacity.



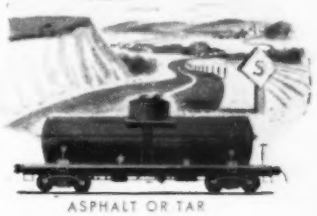
ACETIC ACID

Aluminum Car, 8,000 or 10,000 gallon capacity.



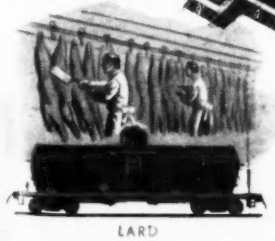
GASOLINE

Clean car, 6,000 to 12,500 gallons; single or multiple compartment.



ASPHALT OR TAR

Heavily steam coiled car; with 2 or more inches of insulation; steam jacketed outlet; 8,000 to 10,000 gallon capacity.



LARD

Clean steam coiled car, usually of 8,000 gallon capacity.

WINE

Insulated car with one to six compartments. Interior coated to preserve quality.

MOLASSES

Steam coiled car with heavy capacity trucks; 8,000 gallon capacity.

SULPHURIC ACID

Heavily constructed steel car with heavy truck capacity. Equipped to unload through dome.

Monomethylamine is now available in commercial quantities. This low-priced primary aliphatic amine is a highly reactive base useful as a raw material for synthesis and as an intermediate in the manufacture of many commercially valuable compounds. Samples will gladly be supplied and our Technical Service Division is available to you for aid in the application of monomethylamine to your products or processes.

CSC

MONOMETHYLAMINE . .

Specifications Purity: Not less than 98 mol % of total amines.

Concentration: 30% to 30.5% by weight in water.

Formaldehyde: Less than 0.3% by weight of the solution.

Ammonia: Less than 0.2% by weight of the solution.

Properties . . . Monomethylamine is a flammable gas having a strong ammoniacal odor.

Molecular Weight: 31.06

Boiling Point: -6.0°C. to -5.5°C. at 768 mm. of mercury.

Melting Point: -92.5°C. Specific Gravity: 0.699 at -10.8°C./15°C.

Solubility: Very soluble in water and in alcohol. Also soluble in ether. One volume of water at 25°C. will dissolve 959 volumes of monomethylamine.

Flash Point (30% solution): 0.3°C. (32.5°F.).

Weight per U. S. Gallon (30% solution): Approximately 7.7 pounds at 68°F.

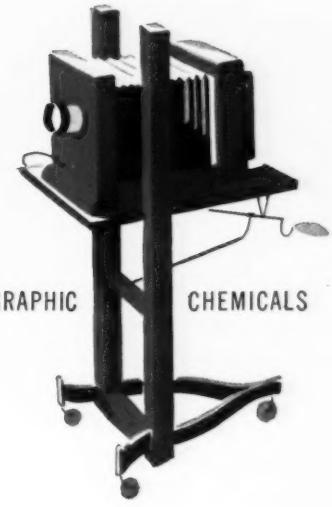
Other **CSC** ***Amines*** Dimethylamine · Trimethylamine · 2-Amino-2-methyl-1-propanol · 2-Amino-2-methyl-1, 3-propanediol · Hydroxylamine (as the sulfate, acid sulfate, and chloride) · Isopropylamine · Diisopropylamine* · 2-Amino-1-butanol* · Tris (hydroxymethyl) aminomethane*

*Available at present in experimental quantities only.

FOR DYESTUFFS

℞

FOR PHARMACEUTICALS



FOR PHOTOGRAPHIC CHEMICALS

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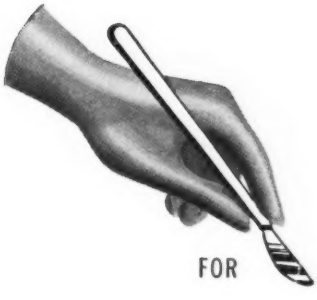

FOR STABILIZER FOR LATEX

COMMERCIAL SOLVENTS

Corporation

17 East 42nd Street, New York 17, N. Y.

Games can be won and lost on the sideline. A good coach builds a winning team. He coordinates and blends his men into a single, hard-fighting unit. In a like manner, Kelco Algins skillfully blend ingredients—join them completely while staying in the background.

Kelco Algins are excellent stabilizing, emulsifying, bodying, suspending or film-forming agents. They are not variable—adjust themselves to changing conditions of environment—insure complete uniformity of results.

Kelco Algins are products of Nature—processed under exacting specifications to assure a true, always-consistent uniformity . . . free of impurities . . . adaptable to the precise standards required for your specific application. In food, drug, and many other industries new uses are constantly being discovered for Kelco Algins.

Let us help you solve your stabilizing problems. Our Technical Department will be glad to serve you. Simply write us your contemplated application.

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Cable Address: KELCOALGIN

"Flappers" Aid Dewatering of Filter-Cake

The "flapper" attachment on Vacuum Filters processing certain products, such as starch, are beneficial in reducing moisture content thru the rearrangement of the physical structure of the filter cake.

Mechanical "flappers" designed by Eimco Engineers reduce the noise from their operation and are a substantial improvement over make-shift attachments used in the past.

Like all accessories built in conjunction with Eimco Vacuum Filters, dependability, efficiency and maximum performance are the paramount consideration of Eimco Filtration Engineers.

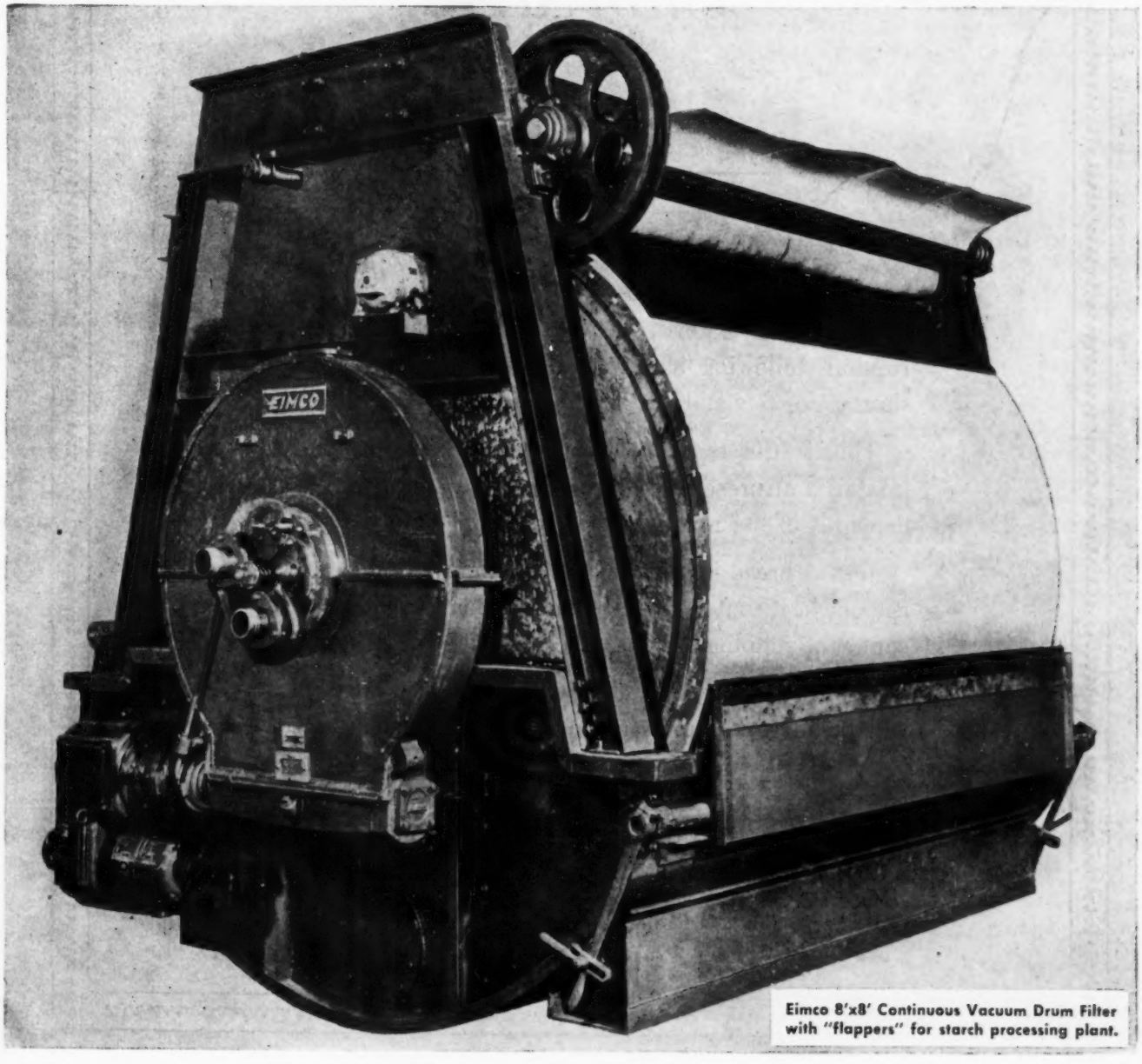
Eimco operates testing laboratories in its New York, Chicago and Salt Lake offices. Testing service is free to the process industries. Write to any of these offices for information on shipping test samples and information on Eimco Continuous Vacuum Filters.

EIMCO

THE EIMCO CORPORATION

Executive Offices and Factories — Salt Lake City 8, Utah: Branches — 67 Wall St., New York 5 — 111 W. Washington St., Chicago 2 — Mills Bldg., El Paso — 1217 - 7th St., Sacramento 14

A-118



Eimco 8'x8' Continuous Vacuum Drum Filter with "flappers" for starch processing plant.

The FACTS Behind the Glycerine Shortage

AS everybody knows, the war and the widespread disruptions following it have caused a serious world-wide shortage of fats and oils, from which glycerine is derived.

This is the reason why enough glycerine cannot be produced at present to supply immediately all the heavy demands of the reconversion period.

Just as bread is short because of the world-wide shortage of wheat so, temporarily, the full demand for glycerine cannot be supplied because of the shortage of fats and oils.

As this situation gradually corrects itself, glycerine will be in good supply again and fully at your service.

GLYCERINE PRODUCERS' ASSOCIATION

295 Madison Ave., New York 17, N. Y. *Research Headquarters, Chicago, Ill.*

SULFRAMIN

A SYNTHETIC ORGANIC DETERGENT THAT IS EFFECTIVE EVEN IN DILUTIONS OF 1 to 10,000

Of special interest to manufacturers of dyeing assistants, tanning specialties, laundry detergents, and general cleaners.

SULFRAMIN DT and SULFRAMIN LW (Powder) Powerful synthetic detergents and foaming agents unsurpassed wherever hard water presents a problem. LW has a higher lauric content, and consequently is preferred when used in water colder than 50° C. Textile processors, manufacturers of dyeing assistants, tanning specialties, bath preparations and laundry detergents use either type, depending upon the temperature of the solution. LW is recommended for automotive cleansers since cold water is commonly used for car washing.

SULFRAMIN DH (Paste) A concentrated, slightly alkaline detergent offering great money value as an all around boil off compound. It is adaptable to the manufacture of various scouring, cleansing and dyeing assistants; and is usable under any water conditions.

SULFRAMIN DT (Paste) A strictly neutral, synthetic detergent, with good wetting qualities and high resistance to hard water. Manufacturers of dyeing assistants, and textile processors, use it principally in scouring and dyeing preparations compounded to function wherever alkaline solutions are to be avoided.

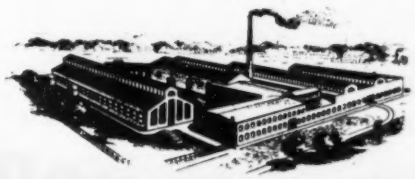
SULFRAMIN DR A neutral compound of high wetting and scouring qualities, having the appearance of a clear, sulphonated oil. It is immediately soluble in hot or cold water, and is therefore an ideal dyeing assistant. It can be employed advantageously as a straight product or in conjunction with various sulphonated oils. It lends itself ideally to the compounding of shampoos, liquid soap, and liquid cleansers.

SULFRAMIN P A powerful built-up detergent which is invaluable in the preparation of household detergents and cleaners. It is particularly efficient in washing machines, packaged laundry detergents, and general cleaners.

SULFRAMIN DHL A clear, leveling agent having the appearance of a sulphonated oil; and suitable for solving your most vexing dyeing problems. It has powerful leveling and penetrating qualities, and assures complete satisfaction in the processing of rayon and acetate fabrics. DHL also lends itself ideally to compounding; and is used extensively in the tanning industries for wetting-back applications.

SULFRAMIN N This is a non-foaming wetting agent, having the appearance of a heavy paste. Although of radically different chemical structure, Sulframin N shares many of the advantages inherent in many of the other Sulframin products. Its strongest feature is its complete immunity to the effects of inorganic acids and alkalies. Consequently, it is preferred in the processing of wool, such as in carbonizing, in dyeing, etc. Not only is Sulframin N an outstanding leveling agent; it can also be safely employed with any amount of alkali.

ULTRAPONE A liquid emulsifying agent, especially useful in water-in-oil emulsions, that is readily dispersible in water, and soluble in all organic compounds; such as hydrocarbons, alcohols, esters, etc. Formulated to lend greater cleaning power to naphtha solutions, Ultrapone is particularly valuable when used in dry-cleansing detergents; adhesive emulsions; and in the manufacture of many cosmetics.



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• CHICAGO, ILL. • IN MEXICO . . . Ken S. A., Mexico, D. F.

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HARDESTY

Yes, you get all three with HARDESTY—Quality in every product, Uniformity in every shipment and Service with every order. That is why HARDESTY has been a dependable source of supply for stearic acid, red oil, fatty acids and related products for many years.

The reason for this High Quality, Consistent Uniformity and Reliable Service is HARDESTY'S never-ending research. HARDESTY laboratory technicians — with long experience in the chemistry of fatty acids — are constantly demonstrating to manufacturers how they can save money by first consulting HARDESTY on a new problem. During the war they provided many answers to the problems created by the shortages of imported raw materials. And many manufacturers who switched to HARDESTY products during the war have decided — on the basis of superior performance for less cost — NEVER to go back to high priced imports!

HARDESTY products, available in sufficient quantities to meet manufacturing schedules, are priced to fit your cost sheets and designed to give better performance. Whether it's an old problem or a new one, our fund of technical knowledge and experience—plus greatly expanded facilities—are ready to go to work for you. Get in touch with HARDESTY today, outlining your particular problem. We'll send information and samples at once. W. C. HARDESTY COMPANY, 41 East 42nd Street, New York 17, N. Y. FACTORIES: Dover, Ohio; Los Angeles, Calif.; Toronto, Canada.

HARDESTY PRODUCTS: Stearic Acid - Red Oil - Glycerine - Stearine Pitch - White Oleine - Hydrogenated Fatty Acids - Animal and Vegetable Distilled Fatty Acids

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COMPANY

We are in position to assure reasonably fast deliveries on this superior hi-flash solvent. Its many advantages make it far superior to average solvents of its kind. We will be glad to send samples and further information.

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RECLAIMING, PLASTICIZING, NEUTRAL, CREOSOTE, AND SHINGLE STAIN OILS

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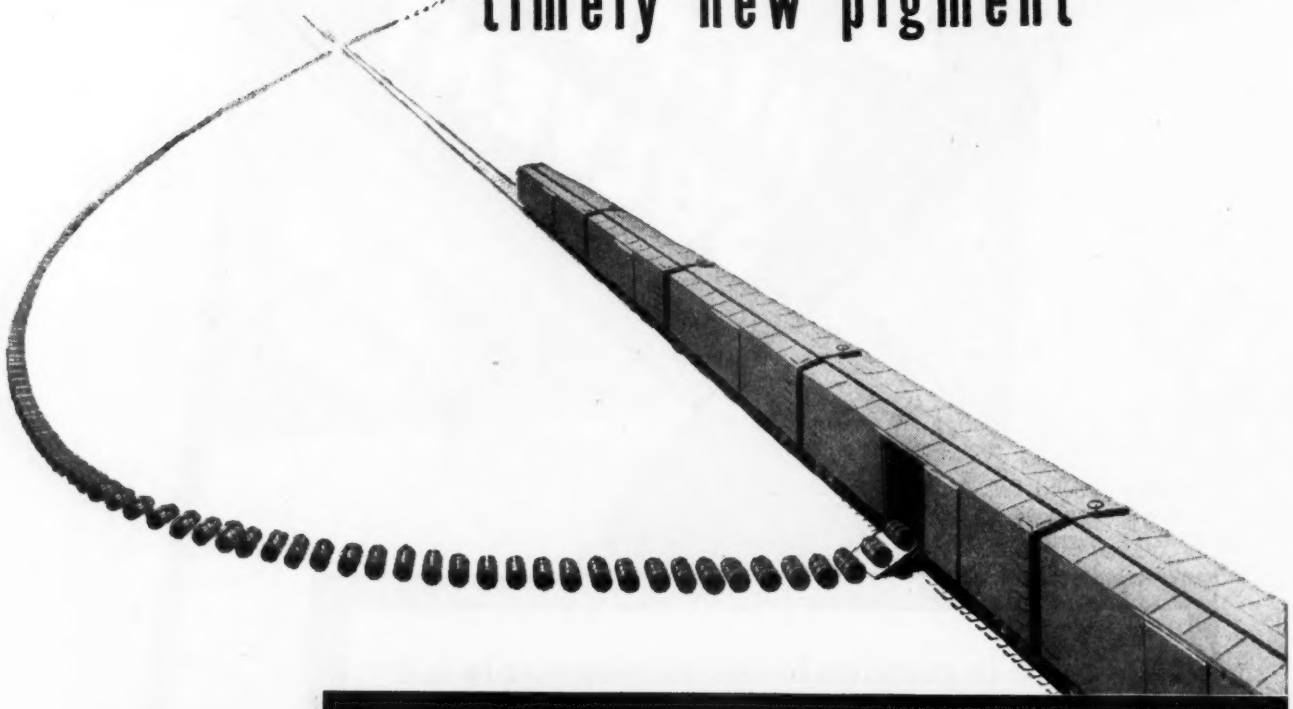
WORLD'S LARGEST PRODUCER OF SYNTHETIC RESINS

RCI

ANNOUNCING

Quantity production of a timely new pigment



No. 5900 AZO RED TONER

From RCI laboratories comes this entirely new organic red pigment—just in time to relieve the acute shortage. As it is produced from freely available raw materials, you can expect quick shipments in quantity following your order. Tests show No. 5900 Azo Red Toner to be similar to 5055 Para Toner Light in masstone, light-fastness, tinting strength, hiding power, wetting, and grinding. Sample orders for individual testing will be promptly filled. Write to the Sales Department, 105 Bedford Avenue, Brooklyn 11, New York.

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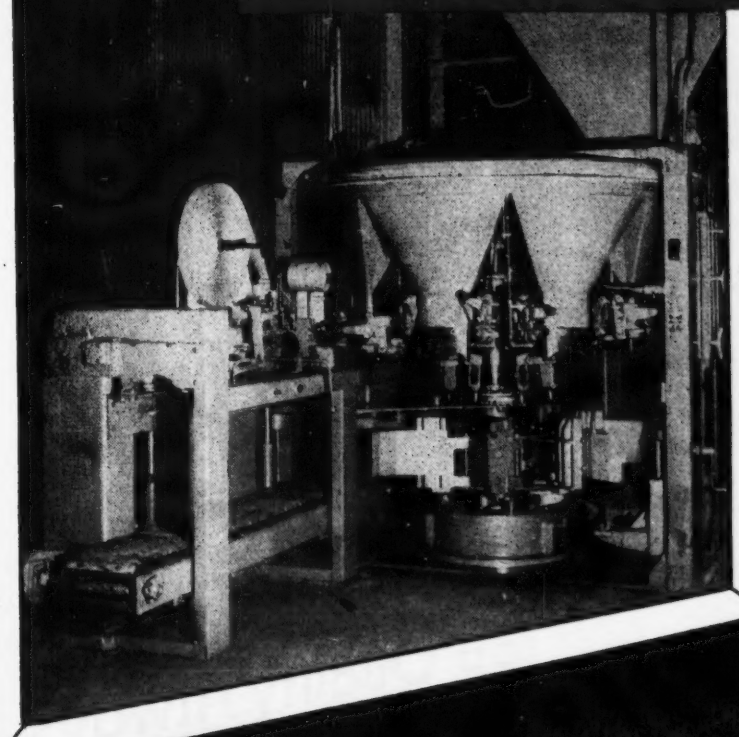
CHEMICAL COLORS • SYNTHETIC RESINS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

MODEL "A" BAGPAKER—

THE COMPLETE PACKAGING "SPEED KING"



The Cushion Stitch Closure

The proper closure or seal for a multiwall paper bag is a vital factor —the Bagpak Cushion Stitch was invented and perfected to provide the perfect solution to this problem. The sewing unit of the Bagpaker described here lays a thick, compressible cord across the end of the bag and stitches AROUND the cord, without going through it, a "snake" or cross stitch of sewing thread. This thick cord forms a cushion or shock absorber that takes up the strains of handling or dropping the bag and prevents the stitching from pulling through the bag walls.

Natural Kraft or Asphalt Laminated tape is applied over the stitching thus sealing the needle holes. This closure becomes the strongest, most moisture-proof part of the bag.

The Model "A" Bagpaker (illustrated) packs fifteen 100 lb. multiwall paper bags per minute—with only one operator—FORTY FIVE TONS PER HOUR. It performs the *complete* packing cycle . . . *it weighs . . . fills . . . closes and seals the bag with the nationally known Cushion Stitch closure.* Two of the larger manufacturers of chemicals are *now* installing additional units . . . *positive proof* of the splendid economies obtainable by this method of packaging. Consult our engineers in your territory—they will gladly study your problem.

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INTERNATIONAL PAPER COMPANY
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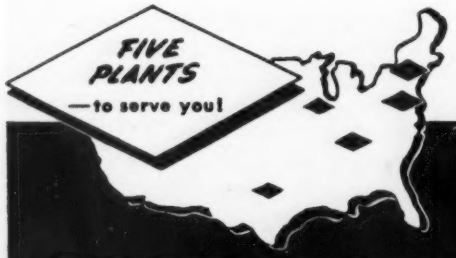
Careful investigation inevitably leads to . . .

STANDARD SILICATES

Top Quality Always

Grades and types for all classes of service



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DIAMOND ALKALI COMPANY

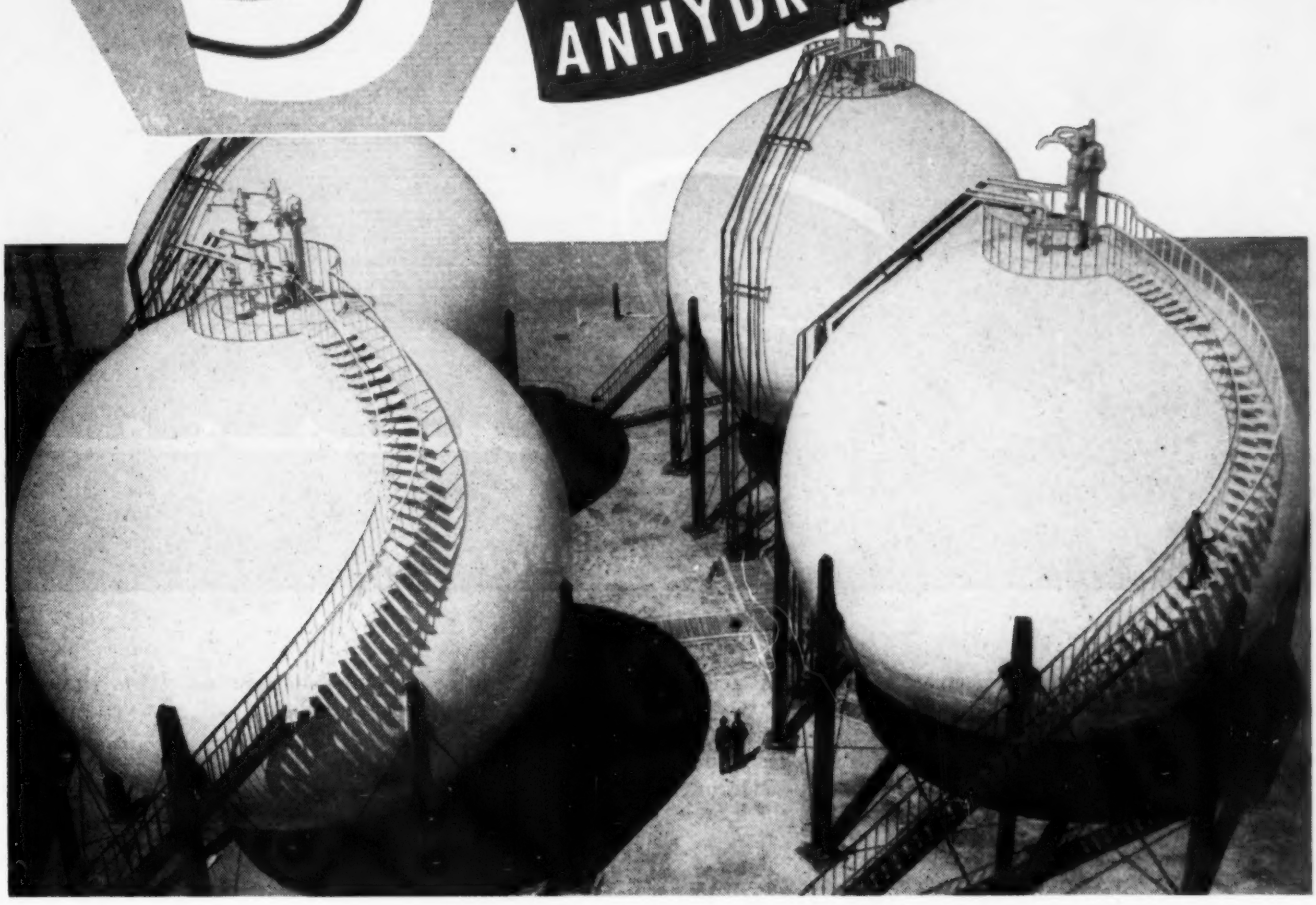
Standard Silicate Division

General Offices: PITTSBURGH, PA.

CHEMICALS

July Deliveries!

INDUSTRIAL NH_3 ANHYDROUS AMMONIA



Spencer Chemical Company, advantageously located to serve the entire U.S.A., is now making deliveries of Industrial Anhydrous Ammonia (NH_3). Large quantities of this 99.5% pure Ammonia, with a maximum moisture content of ½ of 1%, are now available to meet *your* industrial needs.

300 tons of Anhydrous Ammonia per each 24-hour period – that is the production capacity for which Spencer's great Pittsburg, Kansas works was designed. However, during its three years of wartime operation this capacity was far exceeded. Scheduled for production soon are other vital chemicals to serve American Industry and Agriculture – ammoniating solutions, methanol, liquid carbon dioxide, dry ice, industrial nitric acid and allied chemicals.

Spencer Chemical

SPENCER COMPANY

General and Sales Offices: Dwight Building, Kansas City 6, Missouri

WORKS: PITTSBURG, KANSAS

It takes "finesse" to use activated carbon in purification processes due to the fact that the last traces of an impurity are increasingly difficult to remove. For example a minor dosage of carbon may remove the majority of the impurities, but appreciably higher dosages may be required to remove the last traces.

This is one very important factor in the "Know How" of applying activated carbon. Nuchar technicians have spent years in acquiring "Know How" in the specialized field of purification by adsorption. Purification problems are continually being studied in our Research laboratory, which is available at all times for consultation and collaboration. This vital information is yours for the asking.

Special features of Nuchar are its versatility and performance. It is made in a wide variety of standard qualities as well as in special grades for specific problems. We maintain large warehouse stocks throughout the entire country and frequently can make delivery within 12 to 24 hours after your order has been received.

Get in touch with Nuchar today for complete information and samples on the use of Nuchar activated carbon in your purification process.

Industrial Chemical Sales, Division West Virginia Pulp & Paper Company, 230 Park Avenue, New York 17, N. Y.

Please send me a copy of "Nuchar Active Carbon—purification by adsorption."

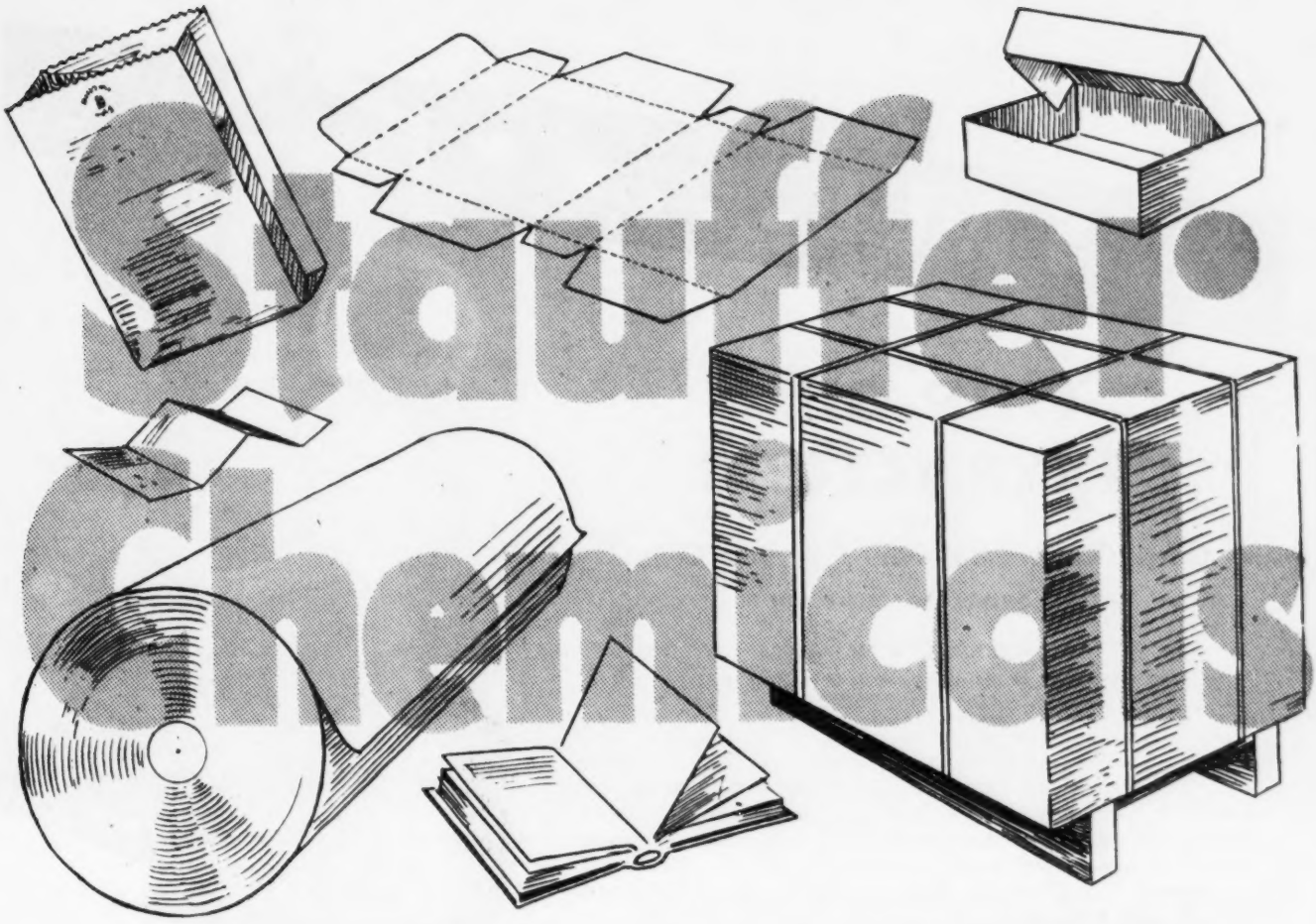
Name .....

Company .....

Address .....

City .....

Nuchar
ACTIVATED CARBON
NUCHAR



FOR THE PAPER AND PULP INDUSTRY

Stauffer tank cars are carrying increasing quantities of chlorine, caustic soda and sulphur to leading manufacturers of pulp and paper throughout the country. With more than a dozen plants strategically located throghout the United States, Stauffer can supply you promptly and efficiently with industrial chemicals that have proved consistently dependable for over sixty years.

STAUFFER PRODUCTS

*Aluminum Sulphate	Chlorine	Silicon Tetrachloride	Sulphur Chloride
Borax	Citric Acid	Sodium Hydrosulphide	*Superphosphate
Boric Acid	*Copperas	Stripper, Textile	Tartar Emetic
Carbon Bisulphide	Cream of Tartar	Sulphur	Tartaric Acid
Carbon Tetrachloride	Muriatic Acid	Sulphuric Acid	Titanium Tetrachloride
Caustic Soda	Nitric Acid		

(*Items marked with star are sold on West Coast only.)

STAUFFER CHEMICAL COMPANY

Stauffer CHEMICALS SINCE 1885

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And Other Government-owned Surplus Centrifugal and Separator Equipment

● CENTRIFUGALS ● SEPARATORS
● CHIP WRINGERS ● PURIFIERS—OIL ● CENTRIFUGAL FILTERS

When war shortages were even more critical than today, centrifugal equipment was widely installed to "prolong tool life", "conserve cutting oils", "save vital metals". Now the same benefits are equally important, if postwar production needs are to be met quickly. Fortunately surplus centrifugal equipment is available in quantity at sale prices in most W. A. A. regional offices. Makes and sizes are standard. Check this profit opportunity today. Fill in and mail the coupon below.

MAIL TODAY!

To War Assets Administration: I am interested in Chip Oil Extractors of the following makes and size or model No.

Make ..... Size or Model No. .....

.....

I am also interested in information on the following:

- Separators
- Centrifugal filters
- .....
- Oil Purifiers
- .....
- .....

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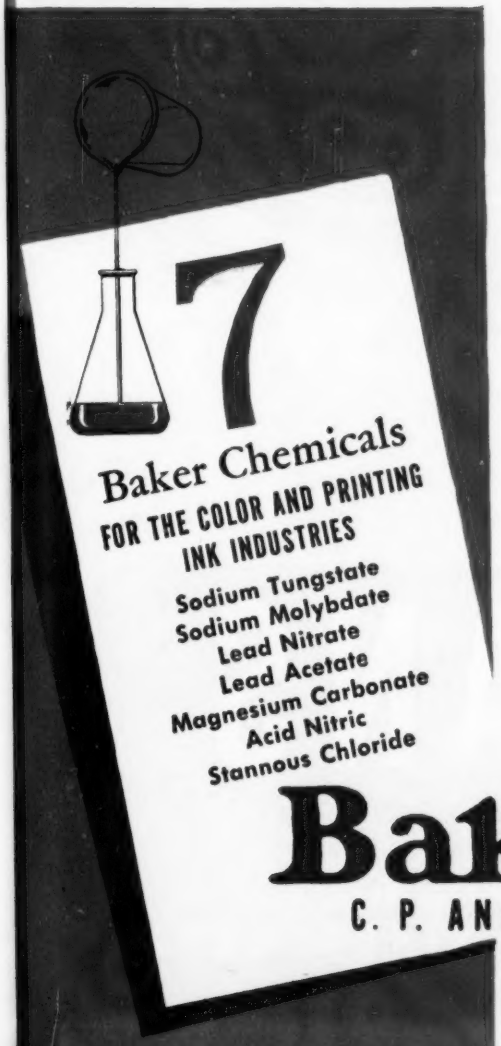

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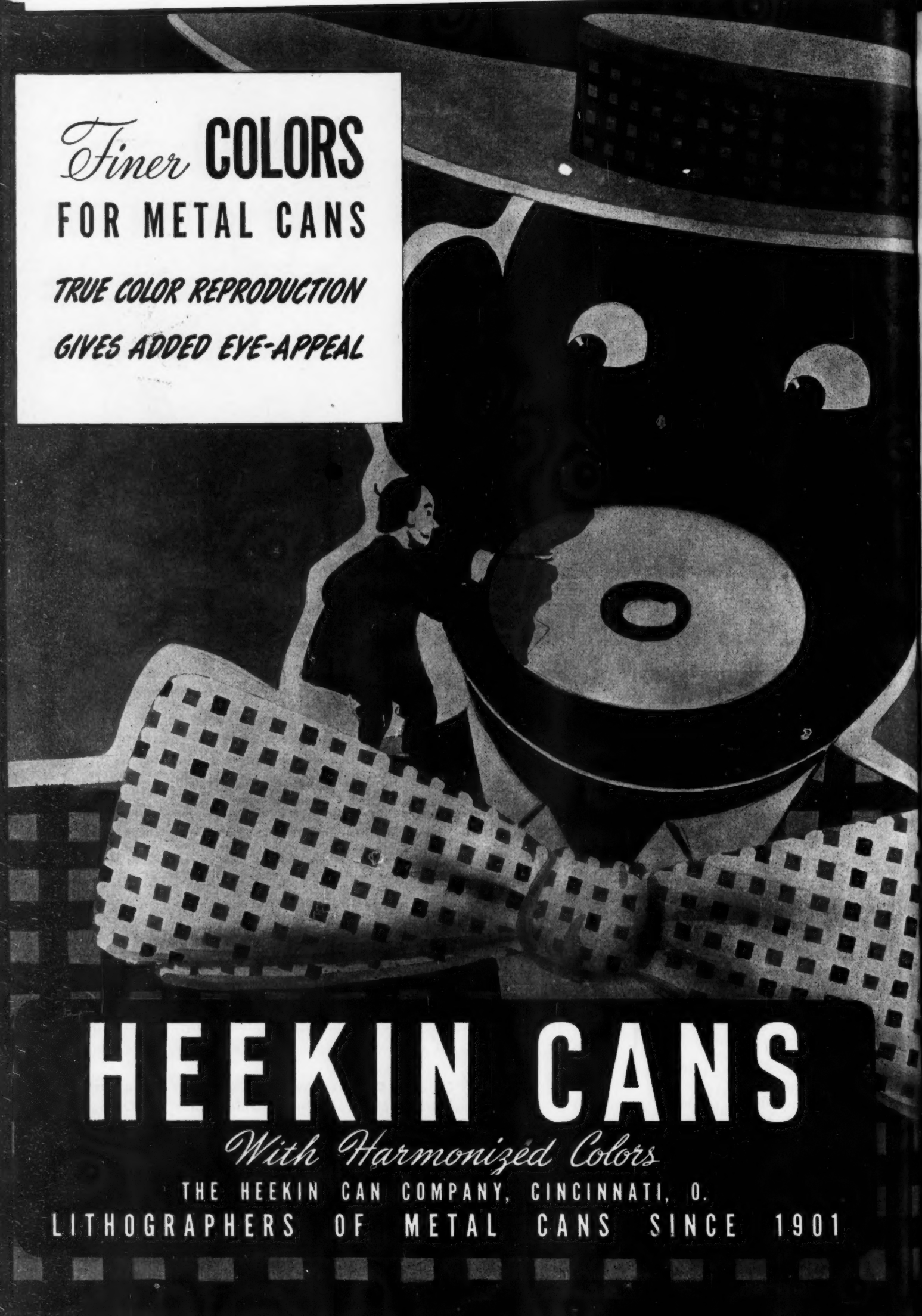
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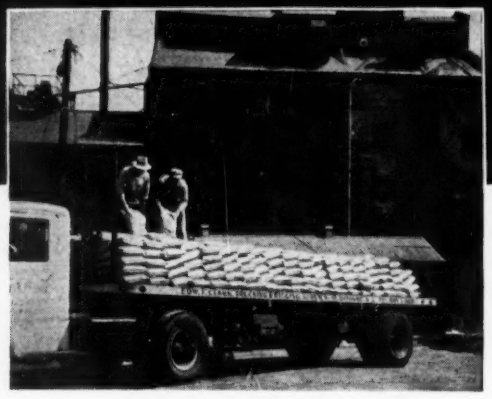

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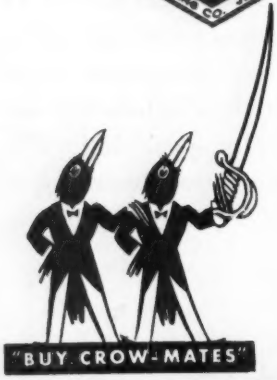

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JERSEY CITY, N. J.

Mud and Stars

by ROBERT L. TAYLOR, editor

AMERICA'S NO. 1 ELDER STATESMAN, Bernard Baruch, has been described as "an idealist with his feet in the mud."

We like this description—not only because we like and admire Mr. Baruch and because it pretty well sums up our own feelings about him, but because we believe also that it expresses a way of looking at things that is very much needed right now, both in and out of the chemical industry.

There is a lot of mud around these days. There always seems to be after a war. And most of us, if we ever doubted it, are finding it is mighty poor stuff to get anywhere through. Some of us, in fact, are just about getting our shoes full to the point of becoming thoroughly fed up with the whole sticky business. Government controls, black markets, labor troubles, and international bickering have combined to form a mess in which it is rather remarkable we have not become more deeply mired than we have.

It is at times like this particularly that we like to take ourselves by the collar and get away from a paper-stacked desk to do some basic long-range thinking, set our sights again by the stars, if you will, the kind of stars we believe Mr. Baruch does such a good job of keeping in view.

Let's look at price control, for instance. Price ceilings which do not allow marginal producers to cover their costs and make a reasonable profit are going to keep those producers idle. Today goods are needed all over the world. Most industry leaders feel that the relaxation of price controls is necessary if we are going to get out the production that the world so badly needs.

But in asking for the removal of such controls, industry must realize it takes on its shoulders a heavy responsibility. This is a fact which it cannot afford to overlook and one which we believe is much more important than any profit considerations involved.

In all of its actions industry today must keep its eye on the goal of a free economy that will provide work and goods for people when they are needed. Removal of price controls will be regarded as a test for the free enterprise system, at home and throughout the world. To pass that test, industry must provide—quickly—enough production to keep prices at a reasonable level. If it should fail, and prices go to high levels and remain there very long, there will be a sure return to controls and a certain paving of the way for socialistic schemes.

That is one of the things we mean when we talk about not losing sight of the important goals in our efforts to get out of the mire. Another is on the matter of labor. Shortly before this was written we talked to some friends from two chemical companies that were in the midst of serious strikes. One situation had reached a very bitter state. We listened to our friend give the company side of the story. We got the union's side from a two-column story in a labor newspaper. The two were far apart, and from the appearance of things it was going to be a tough, costly fight before they got together.

We aren't so sure that a Case bill, or a more bilateral Wagner Act, would have prevented these strikes. We think the Wagner Act should be amended to give employers an equal voice with unions in appealing to their employees, but we also believe that anyone who regards legislation as the answer to all his labor problems is indeed under a delusion. Trite and obvious as it is, and as impossible of attainment as it may seem to some in the front lines of union-management negotiations today, genuine teamwork between employers and employees on a plane of mutual confidence and respect is the only way we can ever hope to have industrial peace in a free country. That must be our goal. It is encouraging to see that a few employers, like Lincoln Electric Co. of Cleveland, and a few unions, like the United Steelworkers of America (with its college training courses for officials on such subjects as union responsibilities and "boss relations"), are striking out along lines in this direction and in at least some cases are showing real results.

There are many other things today where it is easy to let expediency take the place of intelligent thinking. When one is beset with troubles it isn't easy to take the long view. But that is what we must do if we are to find anything more than a temporary respite from our troubles. Industry today needs more leadership with its "feet in the mud and eyes on the stars."

Realism About the Atom

THE BUDGET BUREAU LAST MONTH knocked down to $200,000,000 the Army's request for $375,000,000 to carry on the atomic program. The House Appropriations Committee, however, recommended restoration of the original sum, and Congress concurred. Not a voice was raised in protest against the $375,000,000 amount in the debate preceding the House vote on the appropriation.

Such action is ordinarily bad politics in an election year; taxpayers have a way of remembering Congressmen who are too free with their money. But Congress very probably gauged well the temper of the American public, knowing that we would gladly ante up the extra dollar or so for the atomic program.

In a profit-motivated economy such as ours there is no incentive for private capital to develop atomic weapons; and even the peaceful benefits of the program require research and development too expensive for private exploitation. Russia has no such problem. There the people exist for the State, and if it is to the State's interest to spend money for the development of atomic weapons, the money will be spent without question.

All of the dozen or more atomic control proposals notwithstanding, the realist—call him cynic if you will—will say that it is no easier to legislate control of war or the weapons of war than to legislate fear and greed from the hearts of men. There is no reason to expect tomorrow a reversal of all that history has taught us.

It is well to speak softly, but it is prudent to carry a big stick.—HCEJ.

Money for Government Research

A CONSIDERABLE NUMBER OF CONGRESSMEN apparently have read the Bush report, as no less than ten bills have been drafted and introduced into Congress for the creation of a National Science Foundation. However, the budgetary vicissitudes of at least one government research organization, the Office of Synthetic Liquid Fuels, indicate that a large proportion of the legislative membership is as yet without sufficient understanding—or appreciation—of the first of the five basic principles which Dr. Bush emphasizes must underlie any major program of government research: " . . . there must be stability of funds over a period of years so that long range programs may be undertaken."

Congress originally appropriated $30,000,000 for research on the production of synthetic liquid fuels, to be expended over a period of five years. The Bureau of the Budget in its original estimate allowed $7,000,000 for the third fiscal year, finally recommended $3,500,000, and the House committee reviewing the request disallowed the entire sum. Later the Senate restored an amount of $5 250,000.

Such a history of vacillation in proposed expenditures for a long-term government research program certainly does not inspire confidence in the ability of the government to conduct such programs or to attract the high-class personnel necessary to carry them out. If such researches are to be of any use and returns are to be received from tax money already invested, there must be some arrangement whereby funds can be reasonably assured over a period of time without having an annual Congressional battle.—HWZ.

Achievement Beyond Production

SOME OF THE CHANGES that are taking place in the chemical industry are no better reflected than in the chemical companies' demands for technical men. As short a time as ten years ago men with doctor's degrees in chemical engineering were relatively rare, as was the demand for their services. Last month, however, T. H. Chilton, manager of the development engineering division of du Pont, had this to say about the kind of technical men his company is interested in:

"Broadly, the experience of the du Pont Company is that good, usable training for conducting the productive work of the chemical industry is well provided by the standard courses. But achievement beyond production—the development of new products and processes—is likely to be attained only by those who have demonstrated some special capability and who have a sufficiently solid foundation of basic science and engineering to adapt themselves to new situations. This special capability is to be acquired by graduate study."

At least one university with a traditionally large chemical engineering enrollment reports an indicated eight-fold increase in graduate study in that department over prewar.—RLT.

Not a Time for Colored Glasses

A YEAR AGO INDUSTRY WAS vitally concerned with postwar planning, visualizing a possible sharp recession in business activity. But when the war ended the recession did not materialize. Today, in spite of labor strife, business is good. Orders flow in, and most chemical producers are booked to capacity. Under these conditions of effortless selling a certain lethargy is evident; a viewing of the world through rose-colored glasses; a neglect of reality.

During the past few months we have chatted with a number of our friends in the industry. In essence, their common thought was that they could sell ten times as much caustic, alcohol, borax, or what-have-you "if we had it." Too few appreciate the complete abnormality of conditions. It is a seller's market, and the basic, frequently unrecognized fact is that orders are duplicated, or pyramided. True demand cannot be determined from pyramided orders. Sound future plans cannot be charted on such a basis. We must be realistic.

There is no question but that the future of the chemical industry is promising. But competitive days are approaching. This is no time to overlook the necessity for careful, astute planning. The profits will go to the fit—to those concerns having well-founded and efficient development, sales, service, and distribution organizations. Neglect of these facts, occasioned by present "prosperity," can be inordinately costly.—WAJ.

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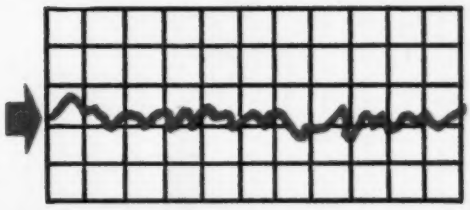

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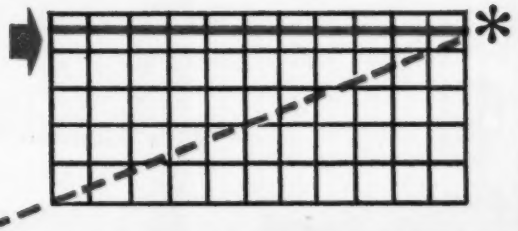

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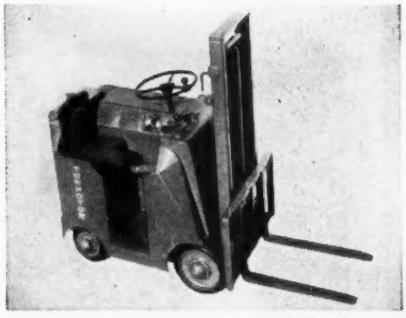
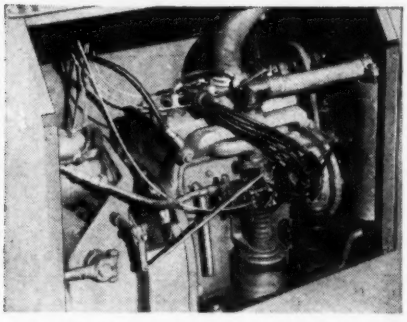


Unique design provides plenty of clear, accessible space for the operator while retaining small overall dimensions and low center of gravity for maximum stability.



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Chemical Industries

JULY, 1946

OXYGEN

By Fractionation at Low Pressures

by WALTER E. LOBO, Director of Chemical Engineering
The M. W. Kellogg Co., New York, N. Y.

PB 9381

THE FIRST SUCCESSFUL LOW PRESSURE UNIT for liquid air fractionation to be built in the United States, the M-7, is the precursor of a much cheaper source of elemental oxygen. The major improvements over previous designs are its simplicity, operation at a maximum pressure of about 100 pounds per square inch gage in the liquefaction and distillation sections, and complete removal of the carbon dioxide and water from the inlet air without chemical treatment by condensation in a special reversing exchanger.

EARLY in 1942 the United States Army Air Corps requested the National Defense Research Committee to initiate development of a compact, lightweight, self-contained mobile unit capable of producing about 1000 scfh of 99.5% purity dry gaseous oxygen, compressed to 2000 psig. Units already in existence at that time were excessively bulky and heavy, weighing about 36,000 lb., including the trailer, which was 8 ft. wide and 28 ft. long. To undertake this work, as well as to develop other sizes and types of oxygen units for all branches of the Armed Services, a central engineering organization was thought to be desirable and The M. W. Kellogg Co. was chosen.

Knowledge of the German Linde-Frankl plants, obtained by the Kellogg Co. before the War led to the belief that a low-pressure liquid-air fractionation unit, requiring no chemicals for air purification, would best fit the requirements. However, in order to adapt such a cycle to the particular application, and to simplify it to its barest essentials, considerable development work was felt to be necessary. This work was divided into the following parts:

1. Development of a lightweight air compressor and driver;
2. Development of efficient air-purifying heat exchangers;
3. Development of an efficient low-temperature expansion engine;
4. Development of a small efficient fractionating column;
5. Development of a dry oxygen compressor.

In order to solve Problems 1, 3 and 5, the Kellogg Co. enlisted the help of Clark Brothers, Inc., of Olean, New York. To obtain design data on Items 2 and 4, the Kellogg Co. was given the cooperation and aid of Prof. B. F. Dodge, of Yale University, and Prof. J. G. Aston, of The Pennsylvania State College. Some background on a new heat exchanger and a reciprocating low-temperature expander engine had already been obtained by Profs. F. G. Keyes and S. C. Collins, of the Massachusetts Institute of Technology.

After much experimentation on the entire unit and problems which arose in connection with the removal of all oil particles and the complete clean-up of carbon dioxide, as well as the testing of all component parts, a satisfactory unit known as the M-7 unit was eventually developed and run. Later, production models were built and operated by the United States Army Air Corps, Board of Engineers, and the U. S. S. R. A description of this unit, which was the prototype of all the other most successful units, is the subject of this article.

The M-7 unit produces oxygen by liquefaction and fractionation of air. The unit was designed to produce 1000 scfh of gaseous oxygen of 99.5% purity under the rather extreme atmospheric conditions of 120°F ambient and 90°F dew point, and to deliver the oxygen, dry, in cylinders at 2200 psig.

Fig. 1 is a diagrammatic flowsheet of the unit showing upon it typical operating conditions, divided into four sections:

1. Air compression system;
2. Refrigeration and air purification system;
3. Fractionation system;
4. Oxygen compression system.

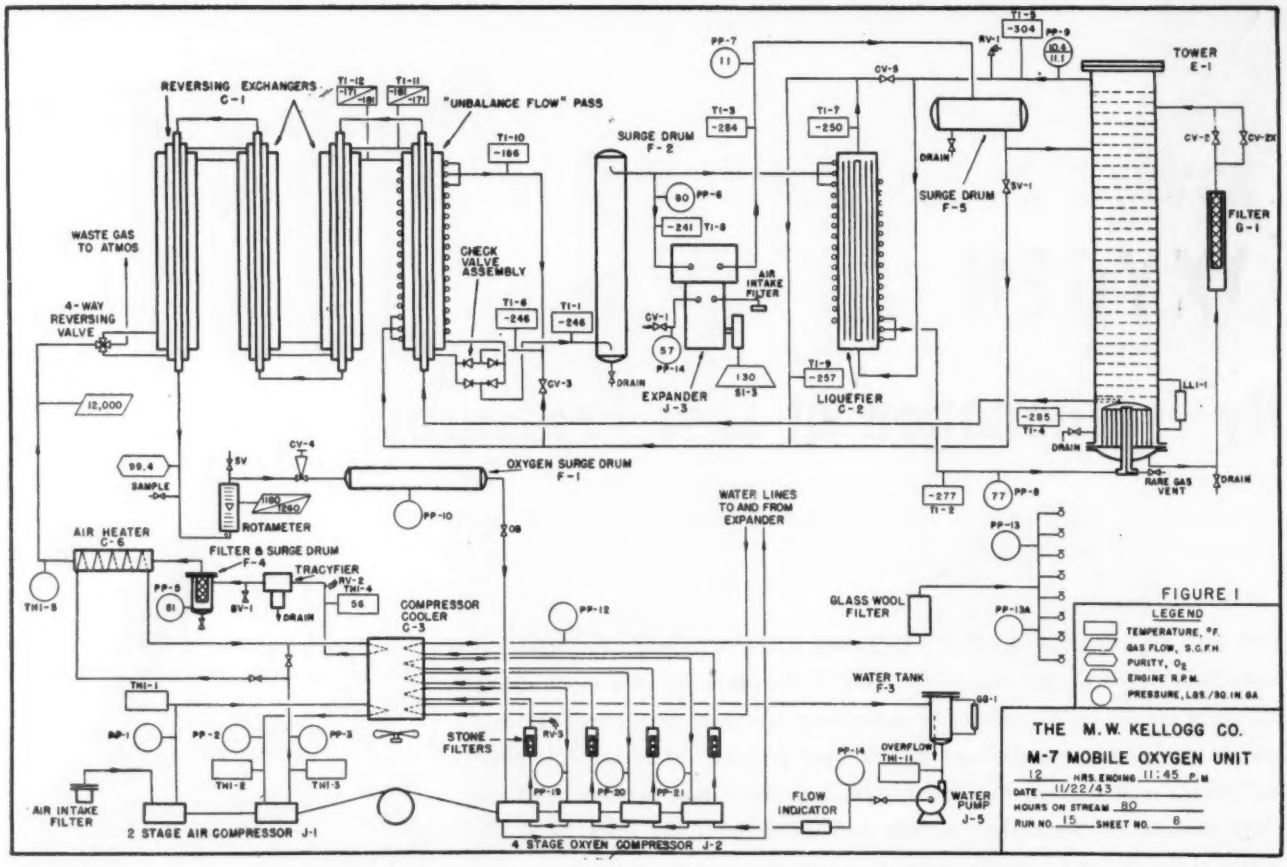
AIR COMPRESSION SYSTEM

Atmospheric air, after being filtered through an air intake filter, was compressed in a high-speed air-cooled reciprocating compressor, and cooled after each stage of compression with cooling air in a forced-draft radiator section. The compressor was a six-cylinder, two-stage opposed, air-cooled, oil-lubricated machine, as developed by Clark Brothers from a Franklin aircraft engine. It was direct-connected to a six-cylinder opposed, air-cooled Lycoming engine.

The 100 psig air, after passing through an entrainment separator, was passed through a special asbestos paper filter to remove entrained oil particles with a diameter as low as one micron. It was found important to remove this entrainment completely because the presence of oil in the air prevented the proper purification functioning of the exchanger, as it became badly fouled and unbalanced with excessive buildup of pressure drop, rendering the system inoperable.

REFRIGERATION SYSTEM

The compressed, filtered air then entered the reversing exchanger through a reversing valve of the "Quick-As-Wink" type. The reversing exchanger consisted of twenty-two 3¼" OD packed tubes, arranged in four banks in series, the first three banks having six parallel passes and the last having four. The total effective length of the exchanger was 17'-2". These exchanger tubes consisted of three narrow annuli outside an empty one-inch tube, each containing a helix wound of flat copper ribbon, each helix being well soldered to its adjoining walls. A fourth stream, known as the "unbalancing



stream", passed through three parallel copper coils wound and soldered to the outside of the four exchanger tubes in the last bank.

The reversing exchanger was thus a three-annulus, three-fluid exchanger in which the incoming air was cooled by means of the effluent oxygen product and the waste nitrogen. The two channels or passages which carried the air and waste nitrogen were very similar in size and in flow resistance, but the oxygen annulus was much smaller.

Though oxygen flowed continuously through its passage, the operation of the reversing valve caused air and waste nitrogen to be diverted periodically from one of the other two passages to the other. As a result, at all times waste nitrogen flowed through the passage which had carried feed air during the previous part of the cycle. This switching of these two streams resulted in the purification function of the exchanger. Thus, in one half cycle when air was being cooled, first water, then ice, and then carbon dioxide snow were precipitated from the air and deposited on the metal surface. Before this process was continued to the point where the surface had become seriously fouled, the electrically operated timer, through an air-actuating system, moved the reversing valve, causing the waste nitrogen to switch to the impurity-laden channel. Although this waste nitrogen was colder than the air, the fact that its total pressure was much lower gave it the property of being able to evaporate the impurities which were lodged on the surface as a result of the passage of air in the previous half cycle. The evaporated impurities were thus carried out of the system by the waste gas so that the unit could operate continuously without chemical purification of the feed air.

The water and ice deposited at the warmer end of the exchanger. at which end the normal relationship between pressure and temperature of the two switching streams was satisfactory for proper evaporation of the water and ice. The carbon dioxide, on the other hand, precipitated at the cold end of the exchanger and in this region normal conditions of temperature and pressure did not suffice to insure its complete evaporation. The fourth heat exchanger passage was, therefore, provided in the coldest part of the exchanger. A portion of the waste nitrogen was diverted through this fourth channel continuously before entering either one of the two reversing annuli of the reversing exchanger. The cold-end temperature approach could thus be maintained between 6° and 8°F, sufficient to insure evaporation of the carbon dioxide.

The feed air, after being cooled in the exchanger to about –246°F, then passed through a system of check valves which operate in response to the reversing valve at the warm end. From check valve manifold the air went to a high-pressure surge drum from which a part of the air passed to a reciprocating expander where it performed external work and generated all the refrigeration required by the plant. The expanded air then passed through a second surge drum and then to the tower as vapor feed entering below the sixth tray from the top.

The expander, as developed by Clark Brothers, was a two-cylinder, single-stage, reciprocating machine, having ringless pistons, small diameter flexible piston rods, flat seat and non-guided valves. The work of expansion was absorbed by an integral two-cylinder, single-stage, water-cooled air compressor.

The main portion of the air from the high-pressure surge drum passed through the liquefier exchanger, which was a two-fluid steady-flow exchanger, consisting of two 3¼" OD packed tubes through which the waste gas passed. About the tube there was wound and soldered a coil consisting of three parallel passes of ½" copper tubing, through which the high-pressure air passed. This air, after being further cooled to about –277°F and partially liquefied entered the condenser, located in the bottom of the tower, where it was completely condensed to liquid before filtering through a glass cloth filter. After filtration it is throttled into the upper or lower pressure section of the tower as reflux, entering below the first tray from the top.

FRACTIONATION SYSTEM

The fractionation system utilized a "single" column with vapor feed. The expander discharge stream at 11 psig, a pressure too low to be condensed in the condenser-reboiler of the tower, was fed to an intermediate point, as stated above. The introduction of this vapor feed to the low-pressure section was beneficial because it allowed a greater recovery of oxygen, based on the high-pressure liquid feed, than was theoretically possible in a simple, single column wtihout vapor feed.

The fractionating tower consisted of a 12" OD thirty-plate, Kellogg designed, six-cap, bubble-plate tower with twenty-four plates below the vapor feed point and six plates above, all having 2" tray spacing. The tower utilized a dry tray at the top as an entrainment separator, and a special oxygen drawoff tube below the bottom tray to minimize entrainment in the oxygen leaving at this point. The bottom section of the tower contained a reboiler-condenser which consisted of 828¼" OD tubes having a total heating surface of 38.8 sq. ft. The bottom tube sheet of the reboiler separated the high-pressure condensing side from the low-pressure fractionating side. Air condensed within the tubes at –277°F, reboiling liquid oxygen at –285°F on the outside of the tubes. A vent of non-condensible gas was taken from above the top tube sheet on the high-pressure side.

Within the column liquid air was fractionated, so that the bottom's product was nearly pure oxygen and the overhead product, or waste gas, contained most of the argon, nitrogen, and some oxygen. The waste nitrogen leaving overhead at about –304°F passed through the liquefier exchanger, a portion, as mentioned above, then being diverted through the fourth channel at the cold end of the reversing exchanger, joining with the main stream before passing through the check valves into the reversing exchanger. This waste gas then left the reversing exchanger through the reversing valve, exhausting to the atmosphere at a temperature about 7° to 9°F below the entering air temperature.

The oxygen, after leaving the tower, passed directly to the reversing exchanger, by-passing the liquefier. Since the oxygen flowed continuously through its annulus uncontaminated by air, the oxygen produced was pure and dry.

OXYGEN COMPRESSION SYSTEM

The oxygen from the reversing exchanger went through a rotameter and then a surge drum to feed the oxygen compressor, which was a dry, carbon-ring, four-cylinder four-stage reciprocating machine developed after many difficulties by Clark Brothers. The compressor was belt-driven by the Lycoming engine driving the air compressor. After each stage of compression the oxygen had to be filtered through a Porostone filter to remove any carbon dust from the rings, and was then cooled in a radiator-type cooler with a blast of cooling air and then charged to cylinders at 2200 psi as dry final product.

MISCELLANEOUS

All water cooling duty, consisting of the cooling for the expander compressor and the oxygen compressor, was rejected directly to cooling air. The oil cooling for the engines and compressors was supplied by built-in air-cooled units.

The air compressor and oxygen compressor inter and after-cooling duties, as well as the water cooling, were performed in a combination radiator using air-cooled Rome-Turney fin tubes.

A supply of hot, clean air for use in thawing out the plant was made available by the air-heater exchanger. This heater was a two-stream exchanger consisting of two 3¼" OD packed tubes in parallel, through which the thawing air passed, and three externally wound and soldered half-inch copper coils through which the hot high-pressure air passed.

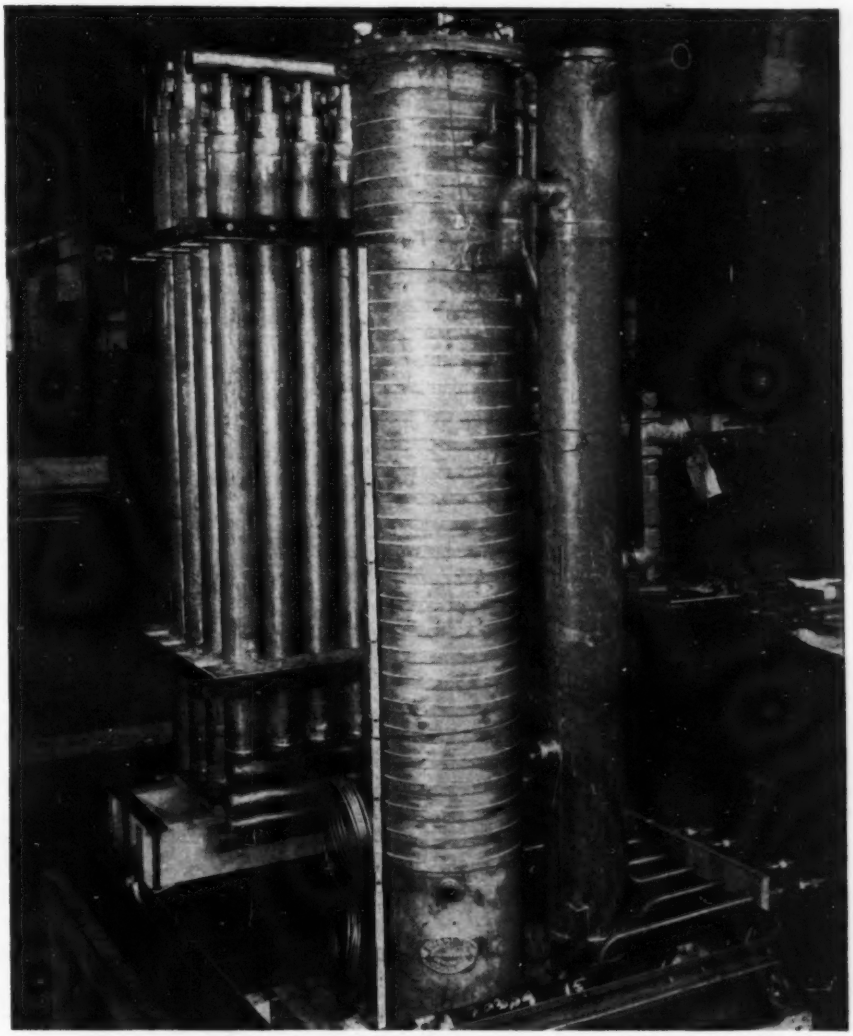
All low-temperature equipment was of copper or brass. Joints were either soft or silver soldered. The cold box insulation consisted of Owens-Corning Bulk Textile "E" Fiber, packed to a density of 15 lb/cu.ft. All openings in the insulation casing, which was of Lindsay structure, were sealed air-tight.

CONTROL

The M-7 unit had five process control valves. CV-1, located on the brake compressor discharge line, was manipulated in order to control the expander speed and, therefore, the refrigeration balance of the unit. When the liquid level tended to drop, this valve had to be opened to speed the expander and build back the level.

Reflux valve, CV-2, throttled the liquid air into the top of the column and was used to control the head pressure at which the unit operatel. This was possible because the tower was equipped with a forced feed reboiler, and when the reflux valve was closed, liquid built up in the condenser tubes. The consequent partial blanking of the condensing surface caused the head pressure to rise so that condensation might proceed on the smaller surface.

The unbalance control valve, CV-3, was set in the waste gas line feeding the reversing exchanger at a point between the check valves and the connections to the fourth or "unbalanced flow" passage at the cold end. When this valve was closed, part of the waste gas was circulated through the unbalance coil and in this manner produced a reduction in the



Courtesy Clark Bros. Co.

Fig. 2. The same general principles are utilized in the above unit as in the M-7. The reversing Collins exchanger for the removal of the carbon dioxide and water from the entering air by freezing are shown on the left while the column for the separation of the oxygen and the nitrogen can be seen in the center.

temperature approach between the two reversing streams. The cold end approach was usually maintained at from 6°F to 8°F, and this valve had to be closed sufficiently to accomplish this.

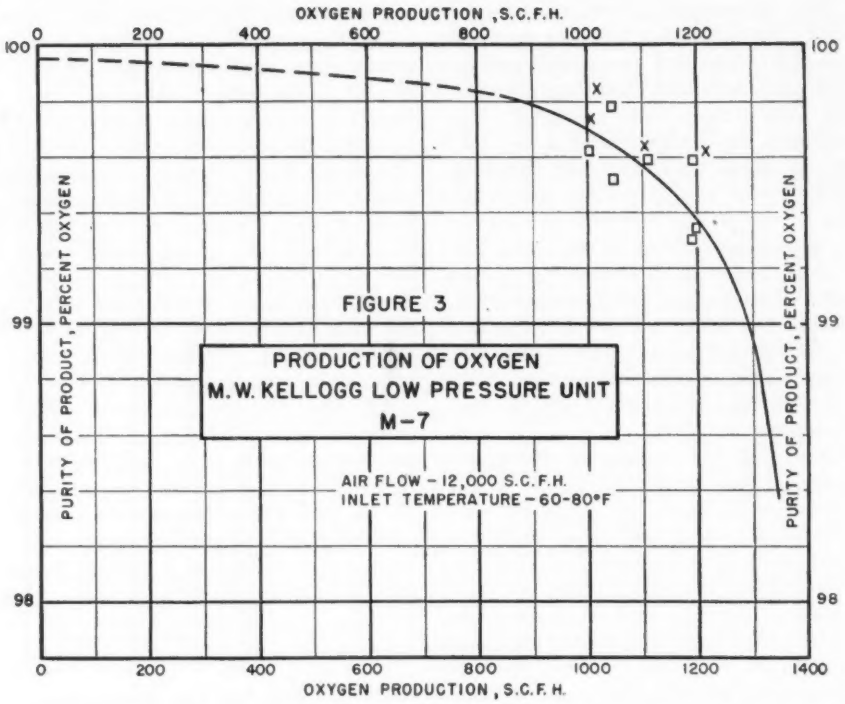
The oxygen drawoff valve, CV-4, was on the warm product oxygen line and was used to control indirectly the purity of the oxygen by controlling the total quantity of oxygen withdrawn.

The liquefier by-pass valve, CV-5, was used to control the reversing exchanger outlet air temperature. As this valve was opened, colder waste gas was sent to the exchanger, and thus its outlet temperature was lowered. This was maintained cold enough so that the bulk of the carbon dioxide was trapped out within the exchanger, but at the same time not cold enough to allow liquefaction to occur in the expander.

Of these five control valves, the reflux valve, CV-2, was the only one that might require some attention. The expander control valve setting required slight attention to control the liquid level, only if there were a marked change in atmospheric conditions. The remaining three valves, however, required no attention after the unit had been brought to a steady operating condition which, when reached, resulted in the complete absence of any periodic variation in pressures, temperatures, or flows within the plant. The unit could thus be operated very successfully by personnel having no process or engineering background.

PERFORMANCE DATA

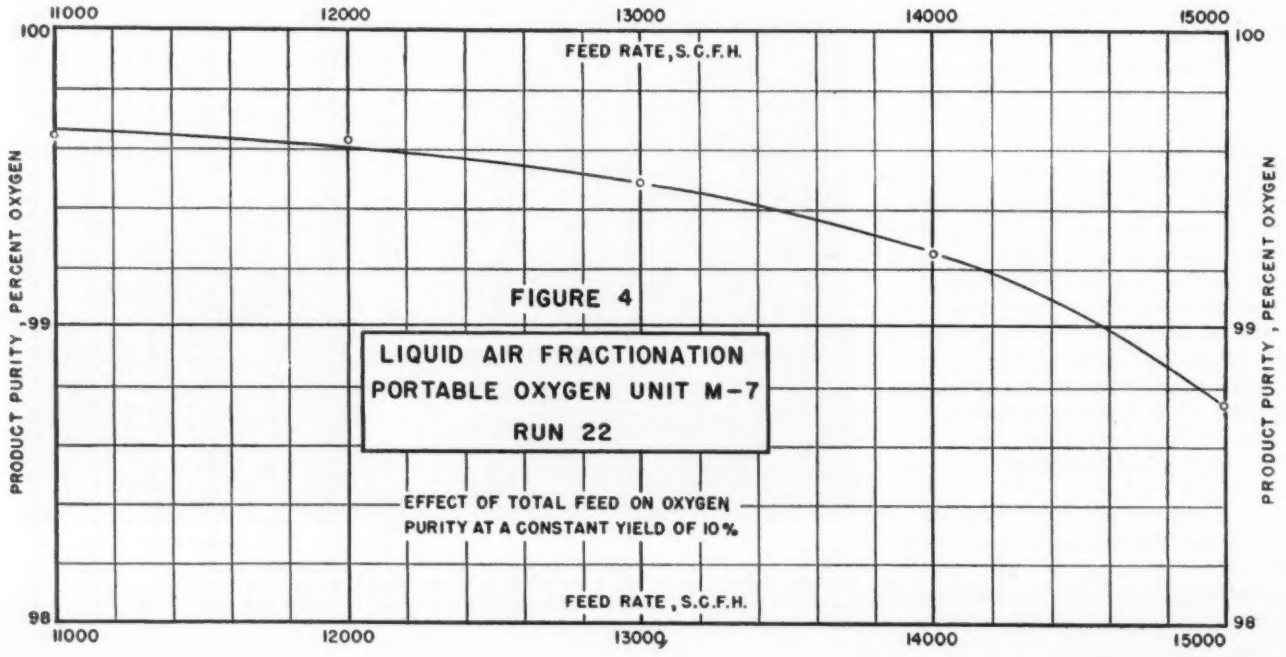
Fig. 1 shows typcial operating pressures, temperatures, and flow quantities. Fig. 3 shows product purity at a total air flow of 12,000 scfh as a function of oxygen production rate. Fig. 4 shows the effect on product purity of increasing the total air fed to the unit when maintaining a 10% yield of product. The tests summarized in these two charts were made with an inlet air temperature of 60°-80°F. On tests made with feed air saturated with water at 135°F the unit produced 840 scfh of oxygen having a purity of 99.7% with an air feed rate of 10,000 scfh, 1000 scfh of oxygen of the same purity with an air feed rate of 12,000 scfh, and 1180 scfh of oxygen having a purity of 99.6% with an air feed rate of 14,000 scfh. Thus, the M-7 unit should be classified as a 1000-scfh unit for extremely hot, humid climates, and as a 1250-scfh unit for the more usual atmospheric conditions. This difference in capacity was due to air delivery from the compressor, and was not due to the refrigeration cycle employed.



The M-7 unit was also run to make liquid oxygen by speeding up the expander to 300 to 350 rpm, and allowing the liquid level to build up in the reboiler. When the level reached 12″-13″, liquid was drawn off and weighed. The liquid produced in this manner was 17lb/hour (equivalent to 200 scfh of gas). In order to keep the purity from becoming too high some 500 scfh of gaseous oxygen were withdrawn while the liquid was being made.

CONCLUSIONS

Upon the successful demonstration and operation of this unit, actual production models were ordered and built. Their design was fundamentally similar, although certain modifications and improvements, particularly in the layout of the plant, were made. The result of this development was thus the first sucessful, really low-pressure, liquid- air fractionating unit to be built in this country.



Ultra-Fine Pigment Particles Basis of New Lacquer

A NEW METHOD OF TRANSFERRING PIGMENT PARTICLES from water to the lacquer medium without intermediate filtering, drying and grinding is the basis of a new lacquer developed by Du Pont. The new technique permits the use of ferric hydroxide as a pigment, heretofore impracticable.

A NEW LACQUER, called "Duco" Metalli-Chrome, was introduced to the press and the automotive trade by E. I. du Pont de Nemours & Co. at a showing in Detroit on May 8.

Of interest—apart from the properties of the lacquer itself—is the patented* technique whereby the pigment is dispersed in the nitrocellulose. That this is accomplished without filtering, drying and grinding of the pigment, and that the pigment particles are a fifth or a tenth the size obtained by ordinary grinding, appear to be significant advances.

PROCESS

The principle involved is preferential wetting of the pigment particles by an organic liquid and subsequent mechanical separation of the water.

The process is uniquely adapted to pigments which are precipitated in water, such as metallic oxides or hydroxides, chrome yellow, Prussian blue, and the like. These are usually obtained in the form of slurries containing varying proportions of solids and water.

The pigment slurry is mixed with a low-viscosity nitrocellulose containing up to 25 per cent water and kneaded in a Werner-Pfleiderer mixer for a few minutes. Then blown castor oil is added and the mass kneaded for another 45 minutes. There is no apparent change in the physical characteristics of the material, but the oil preferentially wets the pigment, displacing the adsorbed water.

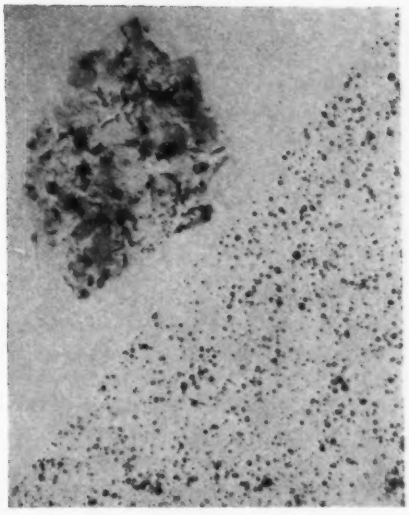
Dibutyl phthalate is then added and continued kneading soon effects a gelatinization of the nitrocellulose and separation of the water into a separate phase. The water is decanted at this point, and kneading is continued until the pigment is dispersed uniformly in the nitrocellulose.

Whatever water is still present is mechanically held, and can be removed by ordinary tray or vacuum drying. This is expedited by rolling the pigmented nitrocellulose into a thin sheet. After drying, the sheet is soft and pliable but not sticky. It can be broken up and stored or shipped with ease. In this condition it is ready to be formulated into lacquer by the addition of proper solvents and additional plasticizer or softener if necessary.

The water content of the pigmented material has been brought as low as 0.3 per cent, but reduction beyond 1 per cent is not necessary for commercial materials.

The above procedure is described in the patent. How commercial procedure differs from that described is not known, but it may possibly employ some of the modifications suggested in the patent.

*U. S. Patent No. 2,140,745, Nov., 1938.



An electron photomicrograph shows the relative sizes of aluminum flake (upper left) and pigment particles in the new finish.

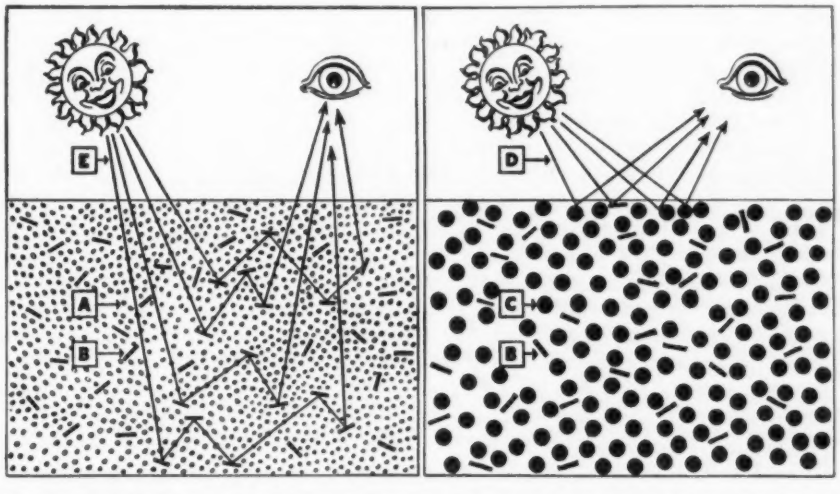
FERRIC HYDROXIDE

The new technique permits ferric hydroxide to be used as a pigment. This was impossible with prior methods, for drying causes the reddish-brown hydroxide to revert to the reddish-orange oxide. Indeed, many of the new commercial lacquers contain ferric hyroxide dispersed as particles averaging about 50 millimicrons in diameter. Also incorporated in the nitrocellulose are aluminum flakes which act as internal mirrors. Since the threshold of visible light is about 400 millimicrons, the light penetrates the film, is dispersed by the pigment, and reflected by the aluminum flakes. This behavior of the light gives the lacquer depth and translucence. While there certainly is nothing new about using aluminum flakes in metallic coatings, their function as mirrors was extremely limited before, since opaque pigmentation prevented all but the surface flakes from operating.

ADVANTAGES

The new method of incorporating pigment is claimed to possess several advantages over older techniques. The time-consuming and expensive steps of filtration, drying and grinding of the pigment are eliminated. Grinding is not as effective, moreover, in attaining small particle size. Beyond a certain point it forms aggregates as rapidly as it breaks them up. Attrition of the grinder contaminates the pigment with metal particles, and the frictional heat may alter the color or properties of the material.

The new lacquers are currently available in over 200 shades of gray, green and brown. The Du Pont Company will tender patent licenses to manufacturers.



This diagram illustrates the behavior of light (D and E) entering Metalli-Chrome film (left) and ordinary metallic finishes respectively. A and C are the new ultra-fine and the conventional pigment particles, and B is the aluminum flake. Note how the light penetrates the new type film whereas it is simply reflected from the ordinary opaque lacquer.

Synthetic Gasoline from Natural Gas

by P. C. KEITH, President
Hydrocarbon Research, Inc., New York, N. Y.

SYNTHETIC GASOLINE HAS LONG BEEN A COSTLY REALITY in petroleum-starved economies. Ground has at last been broken for the American synthetic gasoline plant, which is described here. This plant, although primarily a gasoline producer, also synthesizes large quantities of diesel oil and a water solution of oxygenated materials from a mixture of CO and hydrogen, obtained by the partial combustion of natural gas with oxygen.

CONSIDERABLE interest has been exhibited of late in the possibility of developing a process for making gasoline from natural gas at a cost competitive with the cost of gasoline from crude oil. Such a process would make natural gas this country's first important source of motor fuel independent of petroleum. The need for a substitute oil source grows steadily as withdrawals from our crude oil reserves continue to exceed the rate of discovery of new deposits. The situation was, of course, aggravated by World War II, but it promises to remain a point of real concern in the postwar period. Just how long it will be before we face a really serious crude oil shortage is a matter of conjecture, but this much is certain: our oil reserves are dwindling.

The proven reserves of natural gas, on the other hand, have increased materially in recent years, and the indications are that this trend will continue. In fact, the present production rate is only half the rate of discovery. If the production rate were doubled, thereby approximating the rate of discovery, and if this incremental production were converted to gasoline and oil, motor fuel production would be stepped up by 25%. Given a satisfactory natural gas-to-gasoline process, then, it is evident that natural gas could become an important factor in the country's oil economy.

Furthermore, the manufacture of gasoline from coal is only one step removed from the manufacture of gasoline from natural gas. With our huge coal reserves, an economic coal-to-gasoline process would have the effect of underwriting this country's gasoline and oil requirements for centuries to come.

Hydrocarbon Research, Inc., has developed an economic natural gas-to-gasoline process. Known as the Hydrocol Process, it consists of the conversion of natural gas to a mixture of carbon monoxide and hydrogen, followed by catalytic reaction to produce liquid hydrocarbons boiling substantially within the range of gasoline. By-products are high-grade diesel oil and oxygenated compounds such as alcohols.

THE HYDROCOL PLANT

The first commercial application of the Hydrocol Process is to be made by Carthage Hydrocol, Inc., in a plant soon to be erected at Brownsville, Texas. This plant, to be engineered by Hydrocarbon Research, Inc., has been designed to process approximately 64,000,000 cubic feet of natural gas per operating day and to produce the following:

Motor Fuel—5,800 barrels per day.

Diesel Oil—1,200 barrels per day.

Crude Alcohols (in water solution)—150,000 pounds per day.

The finished gasoline produced by Hydrocol with a Reid vapor pressure of 10 pounds has a clear octane number of 80 CFRM or 88-90 CFRR. This quality of gasoline compares favorably with that produced by catalytic cracking of distillate fractions from petroleum. The diesel oil has a gravity of about 38°A.P.I., a cetane number of 45-50, and a pour point below 0°F. The oxygenated compounds in water solution consist mainly of acetaldehyde, acetone, and ethyl, propyl, butyl, amyl and heavier alcohols. This last product offers an extremely attractive source of chemical raw materials.

The Hydrocol Process calls for the following operations:

(1) The recovery of approximately 0.25 gallons of natural gasoline and butane per 1000 cubic feet of feed gas. (Recovery of this natural product becomes economical only as an incremental operation of the Hydrocol Process.)

(2) The separation of 40,000,000 cubic feet per day of high purity oxygen from air.

(3) The partial combustion of 64,000,000 cubic feet per day of natural gas with the high purity oxygen to produce a mixture of carbon monoxide and hydrogen.

(4) The conversion of this mixture of carbon monoxide and hydrogen—called Hydrocol gas—into gasoline and other synthetic products.

(5) The separation of the gasoline and other synthetic products by fractionation and absorption techniques.

(6) Treatment of the gasoline to remove oxygenated compounds, polymerization of the propylene and butylene, rerunning, blending, etc.

(7) The manufacture and revivification of catalysts.

The Carthage Hydrocol plant is scheduled to be in operation late in 1947 and will cost an estimated $15,000,000. Allowing credit for the diesel oil at 3½ cents per gallon and for the crude alcohols at ½ cent per pound, it is predicted that the "out-of-pocket" cost of the gasoline will run about 2½ cents per gallon. This cost includes all expenses and charges exclusive of capital costs. When capital costs, including interest, depreciation and amortization, are added, the cost of the gasoline becomes 5.25 cents per gallon. This figure compares favorably with figures for producing gasoline of similar quality from crude oil at today's crude prices. Discounting any advantages which would result from a probable increase in the price of crude, it is obvious that the most fruitful avenue for improvement in the economics of the process is in the reduction of capital cost. Substantial reductions in the cost of future Hydrocol plants seem probable.

Presented before the Natural Gas Spring Meeting of the American Gas Association, Cincinnati, Ohio, May 7-8, 1946.

HISTORY

With this picture of the projected plant in mind, it is interesting to review the history of the process. Twenty-five years ago, two Germans, Franz Fischer and Hans Tropsch, discovered a process for the synthesis of gasoline and oil from "water-gas"—i. e., a mixture of carbon monoxide and hydrogen prepared by blasting incandescent coke with steam. This so-called Fischer-Tropsch method was developed to the point of commercialization under government subsidy in that country about ten years ago. While it would have been uneconomic in the United States, it received favor in middle Europe due to the almost complete lack of petroleum and to the resulting artificial economy.

American engineers first became seriously interested in synthetic gasoline shortly before the recent war. A survey of the German work led to the conclusion that the Fischer-Tropsch installations, while highly developed from a chemical standpoint, were basically lacking in engineering design. It appeared that the application of modern chemical engineering practice, as typified by the process installations of the petroleum industry in this country, might very well make it possible to build a plant which would hold its own in an open market.

In reviewing the history of synthetic gasoline, it is convenient to treat separately (1) the manufacture of the carbon monoxide and hydrogen mixture, and (2) the reaction of this mixture to produce gasoline and other hydrocarbons.

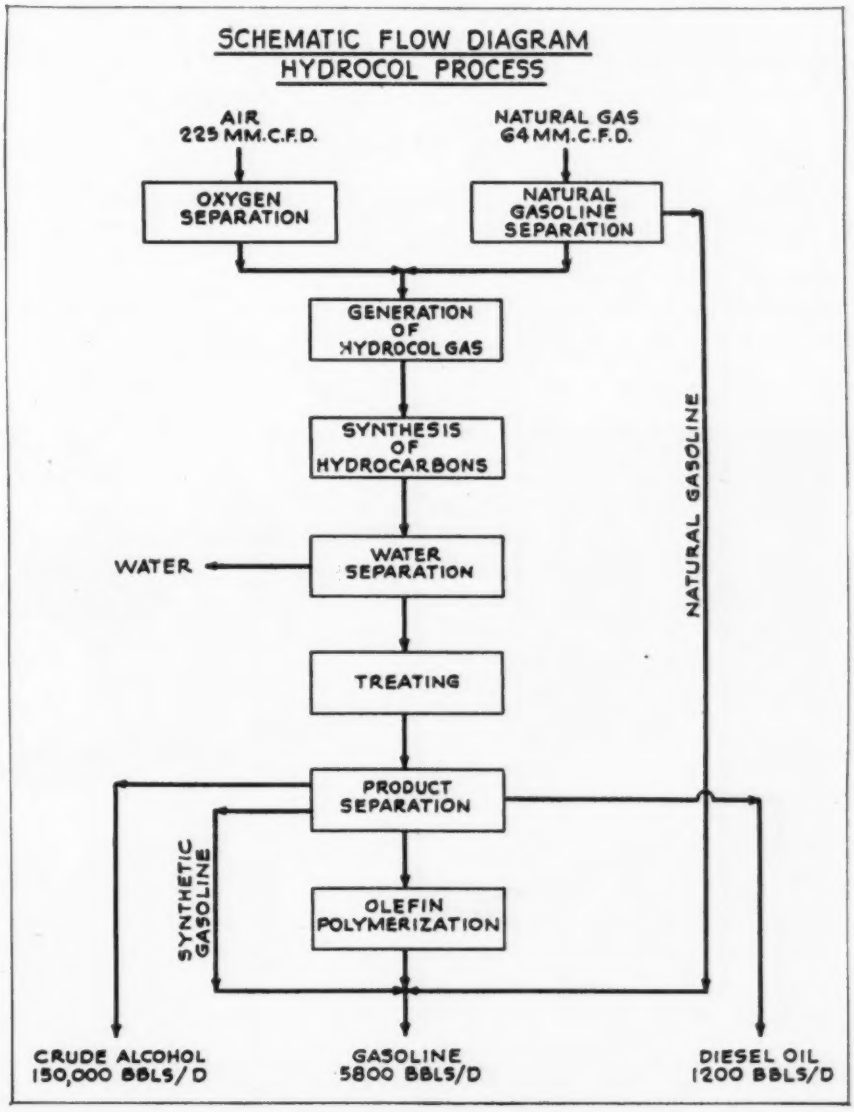
HYDROCOL GAS

The manufacture of carbon monoxide and hydrogen mixtures by the "water-gas" reaction is an old and familiar process. It will be recognized immediately as the basis for the production of "city gas." The first commercial Fischer-Tropsch plant in Germany, built by Ruhrchemie A. G., made use of this reaction to produce the necessary ingredients for synthetic gasoline. Prior to this application, however, I. G. Farbenindustrie A. G. had had occasion to produce mixtures of carbon monoxide and hydrogen, at first for the manufacture of ammonia and later for the manufacture of methanol and synthetic oil. Since I. G. did not have access to sufficient reserves of coking coal, they were forced to adapt the process to "Braunkohle," a superior species of peat slightly lower in rank than bituminous coal. Consequently, they developed a method for producing suitable carbon monoxide-hydrogen mixtures by burning Braunkohle with steam and oxygen. The I. G. process, as finally developed in the middle and late thirties, became a reality when a mechanically sound generator was designed and an economic method of producing oxygen was developed.

The generator, known to the trade as the "Winkler" generator, looks very much like a squat blast furnace. Into an opening in one side there is fed crushed Braunkohle. Through tuyeres around the periphery near the bottom a preheated mixture of oxygen and steam is introduced at high velocity. This gas mixture passes up through a grate, suspending the Braunkohle in the form of a "boiling bed" above the grate. It is interesting to note that this principle of suspending a powdered solid in a high velocity gas stream is also the basis of the fluid catalyst bed, a technique which is finding greater and greater application in petroleum refining and in the chemical industry as a whole. By burning the Braunkohle in the presence of oxygen and steam, temperatures up to 2500°F are attained in the generator, with the result that the contained hydrocarbons are distilled and cracked, and essentially all the whole mass, except the moisture and ash, is converted to a mixture of carbon monoxide and hydrogen.

The oxygen, 98% pure, was produced by the Linde-Frankl process. This method involves compressing and liquefying air and then separating the oxygen from the nitrogen by fractionation. In the Linde-Frankl process, moisture or carbon dioxide is eliminated from the air mechanically rather than by chemical treatment. Much of the economy derives from the fact that upwards of 96% of the feed air needs only to be compressed to about 75 psi gauge. The plant is continuous and extremely simple in operation. In 1938, I. G. was producing millions of cubic feet per day of oxygen by this method.

With natural gas as the starting material in place of coal or Braunkohle, the natural gas can be converted either by direct burning in oxygen or by reaction with steam in an indirectly-fired retort. The latter method is the familiar steam-methane process used in the synthetic ammonia and synthetic methanol processes. The steam-methane process requires a prohibitively high capital cost as well as an excessive consumption of methane. It was, in fact, the realization that cheap oxygen and direct burning of the natural gas afforded the only economic method of producing the carbon monoxide and hydrogen mixture required for synthesis that led Hydrocarbon Research to spend so much effort and money



perfecting the oxygen plant and the direct combustion method.

In the Hydrocol plant to be erected at Brownsville, preheated natural gas and oxygen will be reacted at 250 pounds pressure in the generator to produce the carbon monoxide and hydrogen mixture known as Hydrocol gas. Experimentation at Olean, New York, in a 10-barrel per day semi-commercial plant, and on a larger scale at Montebello, California, has shown that the reaction goes smoothly and controllably. Operating at this pressure is advantageous because it eliminates the necessity for inserting a compressor station between the generator and the synthesis reactor. Since the natural gas will be available under pressure, the only requirement is to compress the oxygen prior to mixing it with the natural gas in the generator. Although the reaction takes place at relatively high temperature, the metal shell temperature can be maintained safely within accepted working limits by the proper selection of insulating materials and the introduction of vapor stops.

It is of interest that the oxygen unit of the Brownsville plant will be the largest ever built. Compressing air to 75 pounds, it will produce 40,000,000 cubic feet per day of oxygen at an estimated cost of 4.8 cents per 1000 cubic feet. This figure is based on an investment of $3,500,000 for the plant (including construction labor, materials, etc.), amortization at 12½% per year, maintenance at 4% per annum, and two operators per shift. Power (amounting to less than 14 KW per 1000 cubic feet of oxygen) and water costs are excluded, since they are both available as by-products of the process and are automatically covered in the price paid for natural gas.

As will be developed later, this oxygen development should be of real interest to the gas industry, since it promises not only to materially lessen the cost of making "city gas" but to open up the possibility of completely gasifying coal and producing therefrom a 1000 BTU pipe line gas.

SYNTHESIS REACTION

The catalytic reduction of carbon monoxide with hydrogen to produce hydrocarbons has been known since 1902, when Sabatier, the great French experimentalist, synthesized methane over cobalt and nickel catalysts at 400°-600°F. In 1912 the B.A.S.F. (Badische Anilin und Soda Fabrik, later I. G.) in Germany discovered that hydrocarbons higher than methane were formed in small amounts when carbon monoxide and hydrogen were reacted over an alkali-promoted iron catalyst at temperatures of 775-850°F and pressure of 100-150 atmospheres. However, the desired product of the reaction was Synthol, a mixture of alcohols, aldehydes, fatty acids, esters, and other oxygenated organic compounds. This led eventually to I. G.'s synthetic methanol process, but as late as 1921, they were reporting the elimination of "objectionable" oil as one of their chief problems.

In 1923, Franz Fischer and Hans Tropsch discovered that the hydrocarbon yield could be greatly increased at the expense of Synthol by decreasing the pressure. In fact, at pressures less than 7 atmospheres, the product was mainly aliphatic hydrocarbons. This work formed the foundation for the Fischer-Tropsch process, which was responsible for the production of a large quantity of synthetic fuels in Germany during the recent war years.

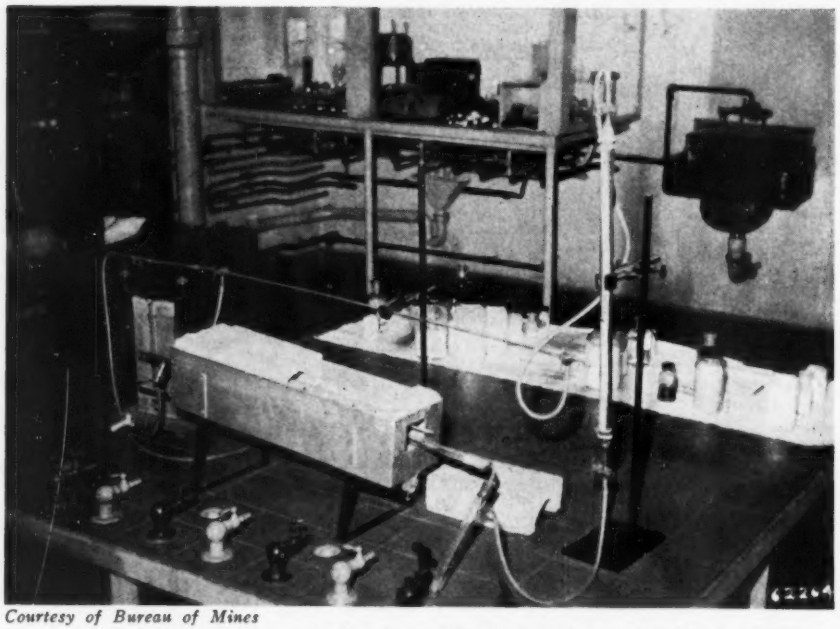
Working under the auspices of the Ruhrchemie A. G., Fischer and his associates examined hundreds of catalysts and finally concluded that cobalt, nickel, iron and ruthenium constituted the most active metals and that thoria and the oxides of other rare earths were good promoters. It was further shown that the presence of some alkali was desirable and that kieselguhr was the best support or carrier of the active ingredients.

By 1933 the process was considered to be well enough developed to build a commercial unit. Accordingly, Ruhrchemie constructed a plant at Oberhausen-Holten with a rated capacity of 1000 metric tons per year (about 8000 42-gallon barrels) of motor fuel and lubricating oil. The first catalyst used was a nickel-manganese-aluminum oxide mixture on kieselguhr; this was later supplanted by a cobalt-thoria-kieselguhr preparation. This plant, as the others which followed it, had many shortcomings which could be tolerated only under a structure supported by government subsidy. Among these were:

(1) The initial cost of the catalyst was high and reworking was expensive.
(2) The catalyst was extremely sensitive and had to be broken in very slowly according to a rigorous schedule.
(3) The catalyst was rapidly poisoned by small traces of sulfur.
(4) Catalyst life was limited to 6-8 weeks, due in part to accumulations of high melting point waxes on the surface.
(5) Conversion of carbon monoxide to useful products was only about 40% of the theoretical, despite the use of low space velocities (maximum of 100 volumes of carbon monoxide per volume of catalyst).
(6) The yield of oil per unit of catalyst per unit of time was low, due to the low space velocity, which in turn was limited by the capacity for removal of the heat of reaction.
(7) The reactors were complicated, extended surface exchangers, with cooling surfaces no farther than 12-15 mm. from any part of the catalyst. Since the process was operated at atmospheric pressure, the reactors were necessarily large.
(8) Recovery of heat of reaction as useful power was low.
(9) The gasoline produced had an octane number of about 40, too low to permit its use as a motor fuel without additional treatment.

From a detailed study of German designs and operating data, it became clear that the only way to lower the costs of the process was to improve its efficiency. This involved finding both a cheaper and more efficient means of heat transfer and a catalyst that would operate at a higher space velocity, the catalyst and the reactor design being interdependent.

For example, if the catalyst temperature must be controlled within 25°F to maintain activity and product distribution, a minimum quantity of cooling surface must be provided on the basis of a reasonable transfer rate. This in turn fixes the maxi-



Courtesy of Bureau of Mines

The first apparatus used by Franz Fischer for synthesizing oil-like products from carbon monoxide and hydrogen. This is located at Mulheim-Ruhr, where Fischer carried out his work.

mum space velocity allowable, assuming that the catalyst activity is not limiting. For example, the heat liberation for 90% reaction of one cubic foot of synthesis gas is about 55BTU; at a space velocity of 100 the hourly duty would be 5500 BTU per cubic foot of catalyst space. With a transfer rate of 10 BTU/sq.ft./hr./°F and a mean temperature difference of 10°F, the cooling surface required would be 55 sq. ft. These conditions approximate the best design of Ruhrchemie.

It is immediately obvious, then, why space velocity in such a reactor as the Ruhrchemie design is definitely limited. Raising it will increase the heat load, and hence the temperature, so that either product distribution will suffer (i.e., fixed gas production will increase) or the catalyst will become fouled with coke. Also, under ideal conditions in such a system, localized hot-spots can still occur. In fact, there is experimental evidence that the true catalyst temperature in a fixed bed system is at least 75-100°F higher than the observed gas temperature and that at isolated points it is much higher.

There can be no question that catalyst activity has seldom been the limiting factor. More often it has been the efficiency of removal of the heat of reaction. In other words, with adequate heat removal, the space-time yield of oil is potentially much greater than anything that has ever been realized. It was on the basis of this conclusion that engineers of Hydrocarbon Research suggested a program of experimental work in which the space-time yield of oil would be studied as a function of space velocity and cooling surface.

In reviewing the work done by Ruhrchemie and I.G., it became apparent that one possible way of improving markedly the space-time yield of oil was to use the fluid or powdered catalyst technique. With the fluid process, it will be recalled, the catalyst is ground to a very fine powder (approximately 75-80% finer than 325 mesh) and is then maintained in a state of turbulence by aeration with regulated quantities of gas. When the powder is properly prepared, it can be aerated or partially suspended by the gas and assumes many of the properties of a boiling liquid. For example, there is a constant motion of the particles, and while the surface of the bed of powder is reasonably fixed, local eruptions of bubbles are evident. Furthermore, the powder flows freely, exerts a static head, and is compressible. Among the advantages of the fluid catalyst technique are: (1) temperatures can be controlled within 5-10°F, (2) the catalyst itself is utilized as a medium of heat transfer, and (3) processes using the fluid catalyst are continuous, since any decline in activity can be compensated by withdrawal of a portion of the catalyst and replacement with fresh material.

Before embarking on a program of experimental work to determine the feasibility of the fluid catalyst technique for the synthesis reaction, it was concluded that the use of a cobalt catalyst was impractical because of the high cost, the limited amount of cobalt available, and the low-octane number of the gasoline. Accordingly, attention was directed to cheap, rugged, iron catalysts.

EXPERIMENTAL WORK

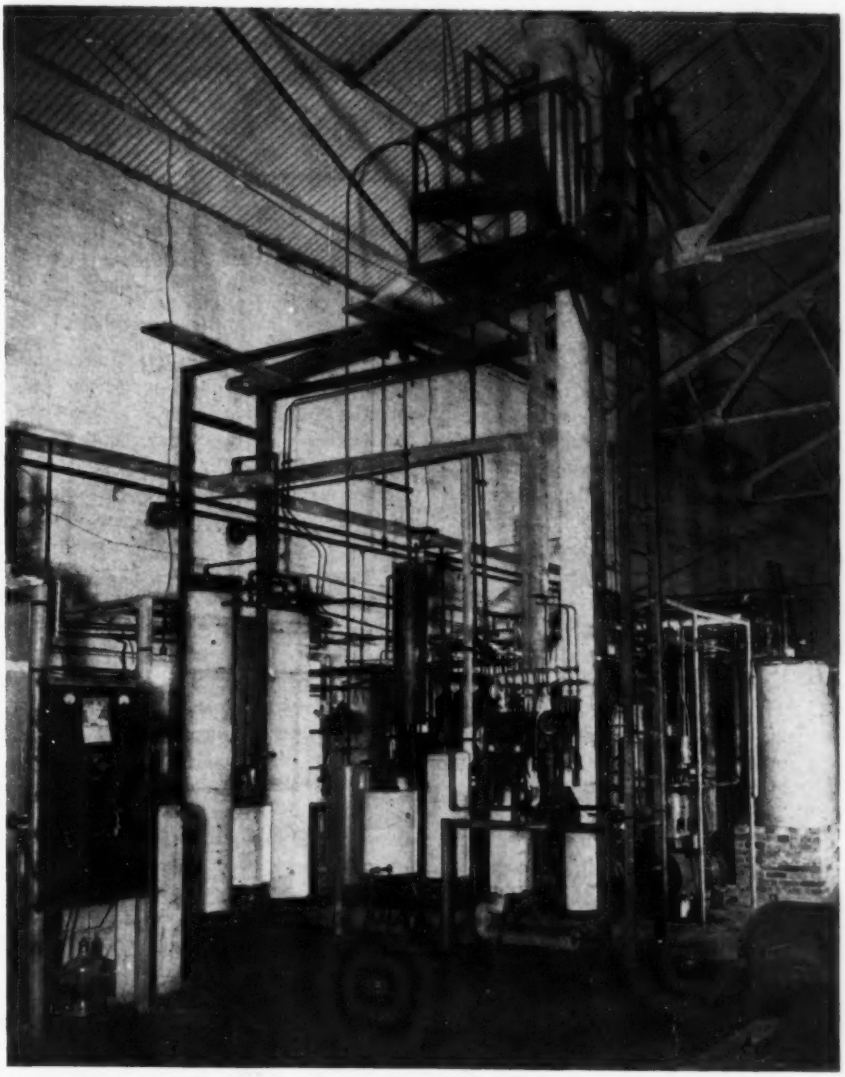
The Hydrocol plant to be erected at Brownsville has back of it over a million dollars of experimentation carried on at Hydrocarbon's experimental station at Olean. The ten-barrel per day semi-commercial plant built and operated at the experimental station contains all the elements of a commercial plant:

(1) A continuously operating low pressure oxygen plant with a capacity of approximately 10,000 cubic feet of oxygen per hour.
(2) Pressure generators for the burning of natural gas with oxygen to produce Hydrocol gas.
(3) The synthesis reaction system.
(4) A product recovery system.
(5) Facilities for de-oxygenating the gasoline produced.

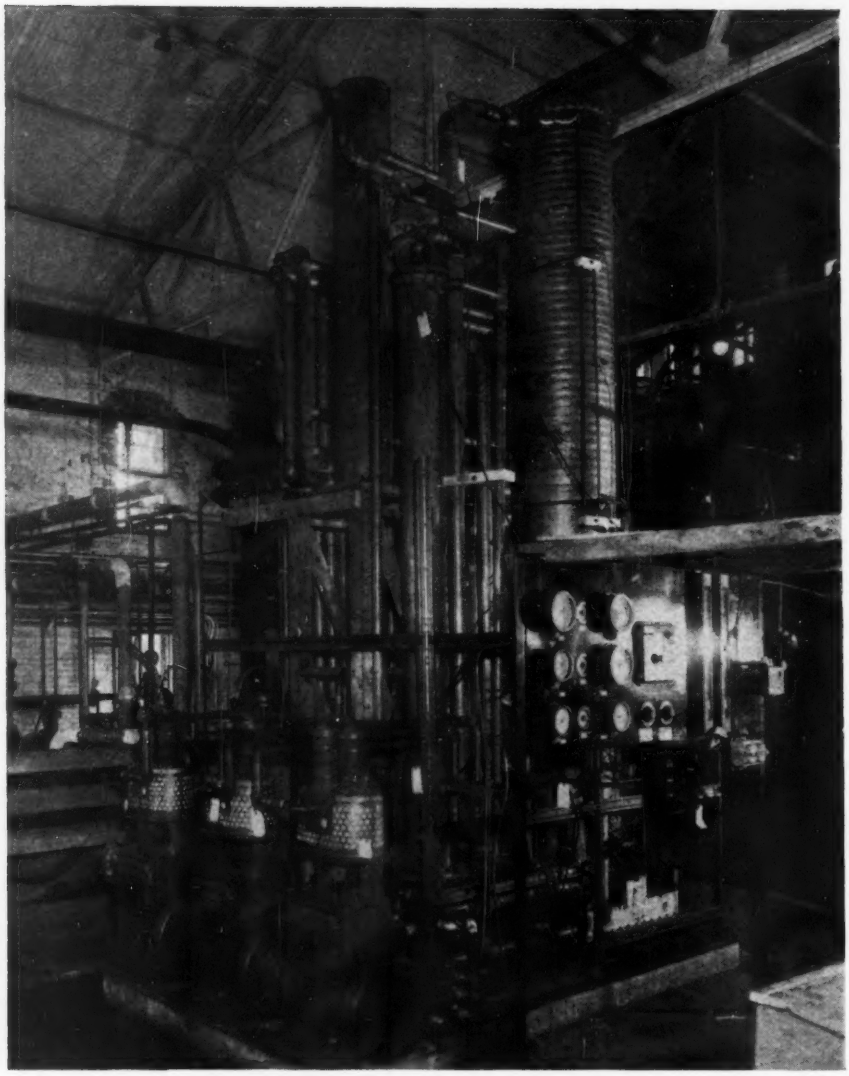
Hydrocarbon Research, Inc., started its development work convinced that the Fischer-Tropsch process was fundamentally sound but was woefully lacking in good engineering design. It seemed obvious that the application of modern chemical engineering practice, as typified by the process installations of the petroleum industry in this country, would result in marked improvements in efficiency. In fact, it appeared probable that such engineering improvements would make the process economic in the United States, using natural gas as the immediate raw material.

The principal conclusions from the research and development work were:

(1) The oxygen plant design is sound and oxygen can be produced by the Hydrocarbon cycle efficiently and at relatively low cost.
(2) Natural gas can be burned directly with oxygen to produce Hydrocol gas. The operation is controllable and the product gas is free of soot.
(3) The fluid catalyst technique more than confirmed expectations with regard to heat control, and is certainly the most economic method of operating the process.
(4) The exothermic heat of the reaction



Data for design of the final Hydrocol unit was gathered in two units at Olean, N. Y. The single white tower in the foreground is the reactor of the first, the experimental pilot plant.



The oxygen required for the preparation of the synthesis gas from natural gas is produced by fractionation at low pressures. Note the low plate spacing in the fractionation column.

is almost totally recoverable in the form of high pressure steam. The Carthage plant will produce upwards of 750,000#/hour of high pressure by-product steam.

(5) Conversions of Hydrocol gas of better than 90% are obtainable with a cheap, rugged catalyst.

(6) The yield of oil, based on carbon monoxide reacted, is higher than that obtained by any German investigation, and the treated gasoline is of a premium quality.

(7) The allowable space velocities, and hence the space-time yields, are order of magnitude greater than any achieved in Germany.

(8) The yield of gasoline can be readily controlled to constitute better than 80% of the total useful products.

(9) There are no real difficulties or novel methods required in separating the products or in deoxygenating the gasoline.

The initial million dollar research and development program carried on by Hydrocarbon Research was financed by three companies: the LaGloria Corporation, the J. S. Abercrombie Company, and the Socony Vacuum Company. Later material development and engineering contributions were made by the Standard Oil Company of New Jersey and by the Texas Company. The country as a whole should recognize the role these companies have played in furthering the development of cheap synthetic gasoline in the United States.

SIGNIFICANCE

The successful operation of the plant at Brownsville could have far-reaching effects upon our national economy. These effects are most likely to be first felt in the oil industry. The feasibility of producing large quantities of a superior motor fuel from a portion of our "known" dry gas reserves will have been demonstrated. Since these reserves amount to about 175 trillion cubic feet, potentially they represent about as much oil as do our crude oil reserves. In other words, when the Brownsville plant has operated successfully and economically over a period of time, it would then be proper to reckon our oil reserves at, say, 40 billion barrels, rather than at 20-odd billion barrels. Then natural gas will begin to compete with crude oil as a raw material from which to produce refined products. What effect this competition will have upon advancing crude oil prices is anybody's guess. Mine is that it will put a ceiling of less than $2.00 per barrel on crude oil.

An obvious corollary to the above has to do with gas conservation. Sometimes it is difficult to legislate conservation, but when conservation is clearly and immediately profitable, no legislation is needed. Despite the conservation measures now enforced by various state-regulatory bodies, gas wastage still amounts to about 600 billion cubic feet per year. The major source of this loss occurs in gas vented from oil-gas separators at the fields and from natural gasoline plants. The successful operation of the Brownsville plant will place a portion of this gas in the category of a substitute for crude oil. If it were all used for such a purpose, some 60 million barrels per year of oil would result. The problem of collecting the gas in large quantities will prevent the use of the entire amount, but some of it will be used.

Further, the Brownsville plant will indicate a method whereby gas now used as refinery fuel can be converted into gasoline. Again, if all such gas were used for gasoline synthesis, the amount produced would approximate 7½% of our 1945 production. Obviously, all will never be so used, but some refineries will use it, substituting heavy bunkering oil for gas as refinery fuel. And this will lead to an advance in oil prices.

So much for the immediately foreseeable effects upon the oil industry. But how does this development directly and indirectly affect the gas industry? The effects could be fundamental and far-reaching. Firstly, the competition of natural gas with crude as a source of gasoline is certain to increase the price of gas at the well head. In the next several years, improvements in the Hydrocol process will make possible the production of a barrel of oil from 8000 cubic feet of gas, including all gas used for fuel. If at that time the capital and operating cost of a Hydrocol plant is on a par with an oil refinery (and there is no basic reason why this cannot become true), then 8000 cubic feet of gas at the refinery will be the equivalent of a barrel at 38° A.P.I. gravity Mid-Continent crude. Then, under these conditions, gas at 17 cents per thousand just balances crude oil at $1.35/bbl. as delivered to the refinery.

It is my guess that gas in such localities as Hugoton, East Texas and the Gulf Coast will never quite reach the equivalent price of crude oil. In the first place, gas transportation is inherently more expensive than the transportation of crude oil. Secondly, gas must always be transported by gas pipe lines and not by tankers or tank cars. Therefore its

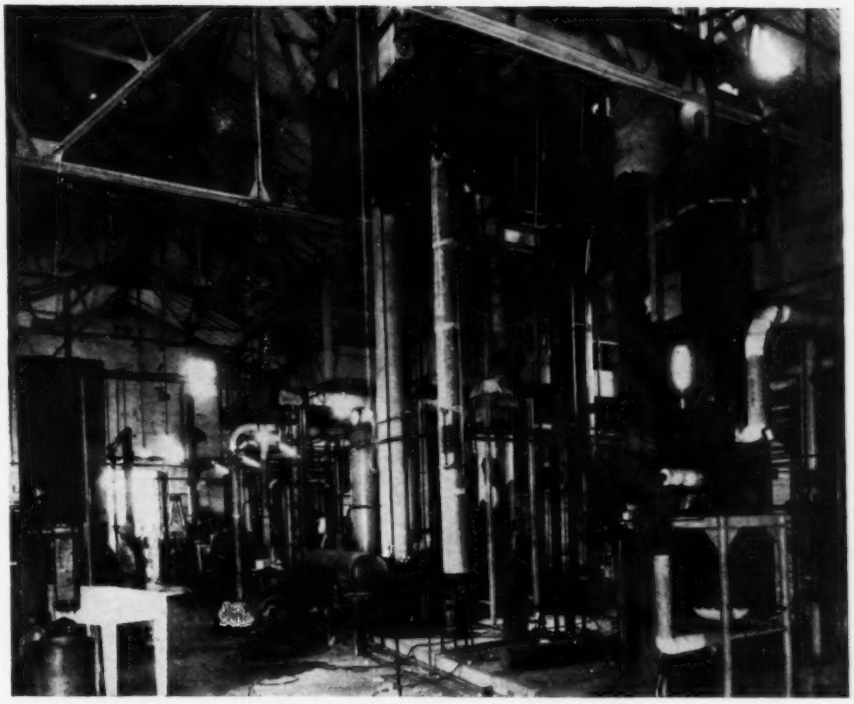
mobility is limited. Thirdly, the effect which the actuality of cheap oxygen will have upon manufactured gas costs will tend to limit the competitive value of natural gas for pipe lines. Nevertheless, gas prices will go up. It is not unlikely that, in the localities I have just mentioned, gas at the well head will be worth 10-12 cents within the next decade.

This increase in gas price will affect various pipe line companies differently. Those producing more gas than they buy will benefit. Those buying more than they produce may suffer temporarily. I use the word "temporarily," for once natural gas is competitive with crude oil as a source of gasoline, a price floor is established for gas to pipe lines. I should think that any rate-making body would logically base its calculations upon this competitive and possibly posted price of natural gas, rather than upon the present assumption that a gas well is an integral part of a pipe line system. If gas rates are raised in step with the competitive price set by the price of crude, then with an increasing gas price, the pipe line companies, at worst, will suffer only until the corresponding rate adjustments are made. In any event, it would seem wise for the pipe line companies to secure adequate gas holdings and reserves.

I have said that cheap oxygen will tend to limit the price of natural gas in such localities as Kansas and Texas. You will recall that the Germans completely gasified "Braunkohle" continuously, successfully and economically. It appears that improvements, comparable to those made in the Fischer-Tropsch process, can be made in the gasification of coal.

It has long been the ambition of the manufactured gas industry to produce city gas directly from coal and oxygen. Compared with the present intermittent methods, the direct gasification process would be more thermally efficient, would eliminate the use of expensive gas oil and could be continuous. Hydrocarbon Research, Inc., has such a process in an advanced stage of development. A small pilot plant has been built and successfully operated in which both coking and noncoking coals are distilled and partially gasified with oxygen. The gas as run from the pilot plant has had calorific values higher than required for city gas. Freed of carbon dioxide, the heating value of the gas has varied from 580 to 900 Btu per cubic foot.

Based upon these preliminary data and again applying advanced oil refinery techniques to the process design, "guesstimates" have been made which indicate that in such localities as New York, city gas can be made from bituminous coal at a cost less than the cost of natural gas purchased at the wells in Texas for 5 cents per 1000 cubic feet and transported to the east coast by pipe line. Also, the estimated cost of gas by the direct gasification process is much lower than the present cost of manufactured gas.



A view of the towers and reaction system of the second experimental unit, a 10 barrel per day plant, during construction—distillation columns in the center and reactor at the right.

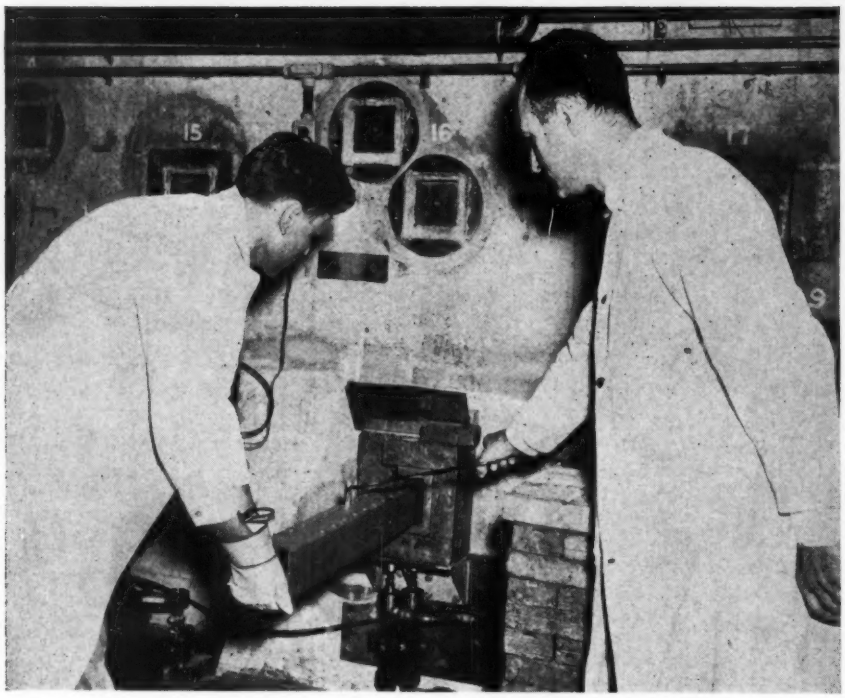
These studies posed the further question, "Why haul coal to New York and then gasify it?" "Why not gasify it at the mine mouth?" Hence, a careful, thorough, and intensive survey was made of all German processes. These were evaluated in the light of the data gathered from Hydrocarbon's own experimental work. Then a hypothetical plant was designed. From this preliminary work, it appears certain that eventually a process will be developed whereby either coking or noncoking bituminous or anthracite coal can be completely gasified, yielding a pipe line gas of approximately 1000 BTU heating value. These preliminary studies further indicate that the net thermal efficiency—i. e., the ratio of the heating value of the product to the heating value of the coal, including all coal used as fuel —will be about 80%. In other words, it is to be expected that one ton of 13,000 BTU/lb. coal will yield 20,000 cubic feet of synthetic natural gas.

Hydrocarbon Research is presently building a semi-commercial plant to produce directly, continuously and with oxygen both "city gas" and "pipe line" gas. It is hoped the plant will be in operation this year and that quantitative design data will be available next year. Our expectations for the process are based in part upon the data gathered during the course of development of the Hydrocol process; and if they are realized, one can visualize gas pipe line companies serving the north and the northeast manufacturing "synthetic" natural gas from coal mined in West Virginia, Illinois and Pennsylvania. Obviously, this development of the direct gasification process will tend to place a ceiling on the price of natural gas.

We have now seen how the Hydrocol process is likely to affect both the price of crude oil and the price of natural gas, placing a ceiling over the former and raising the latter. We have also seen how the development of a direct gasification process will tend to place a ceiling over the price of both natural gas and manufactured gas. A further factor to be reckoned with in our future economy is the approaching coal-to-gasoline process. An economic process for transforming coal into gasoline will put a ceiling over the price of crude oil even more effectively than the Hydrocol process. Also, it may well increase the value of some of our low grade coal deposits. However, the amount of coal required to satisfy our entire gasoline market will always be small in comparison to the coal used for other purposes.

I said "approaching coal-to-gasoline process," for we are now well on our way to gasifying coal cheaply, and the combination of the direct gasification process and the Hydrocol process *is* the coal-to-gasoline process. In fact, on the basis of figures now available, 6-cent gasoline from $2.00 per ton coal is not more than two or three years off.

In summary, the successful development of the processes just reviewed will (1) assure this country of an adequate supply of cheap gasoline, city gas and petroleum products for centuries to come; (2) make available cheap oxygen for use in the chemical and metallurgical industries as well as in the gasoline and gas industries; and (3) provide cheap raw materials, particularly carbon monoxide, hydrogen and oxygenated hydrocarbons, to serve as the basis of a great new synthetic chemicals industry.



1 Material to be subjected to neutron bombardment is placed in graphite block preparatory to insertion in uranium pile.
(Official U. S. Army Photos)

THE SAME TECHNIQUES THAT GAVE US THE ATOM BOMB are now being used to provide radioactive materials for fundamental and applied scientific research. The use of these chemicals — especially the active isotopes of carbon, sulfur, phosphorus and iodine—will undoubtedly throw light upon the mysteries of disease, metabolism, drug action, and a great many other phenomena which are essentially of a chemical nature.

"OPERATION WELFARE"

Radioactive Chemicals for Research Now Available

RADIOACTIVE ISOTOPES

THOSE AVAILABLE:	C, Na, P, S, I and a large number of less common ones.
TO WHOM:	Accredited institutions for fundamental scientific, clinical and technical research.
FROM WHOM:	Isotopes Branch, Research Division, Manhattan District, P. O. Box E, Oak Ridge, Tennessee.
FOR WHAT: (in priority)	(1) Fundamental science and human applications requiring small quantities.
	(2) The same, requiring larger quantities.
	(3) Education in radioisotope techniques and applications.
	(4) Applied science research.
BUT —	Requests must be made through a recognized institution.
	Results of research using the materials must be published.

THE DESTRUCTIVENESS of nuclear energy is amply attested to by the crumpled remains of two Japanese cities, but until last month peacetime applications of the U. S. Army's Manhattan Project were shrouded in secrecy.

Then, in a statement by the War Department, announcement was made of the availability and proposed release of radioactive materials to science and industry, where they will undoubtedly provide the key to far-reaching discoveries in biology, medicine, and other fundamental and applied sciences. They will be used in two important ways: as tracers, for following the course of atoms in chemical, biological, and technical processes; and, after further research, as therapeutic agents for the treatment of certain diseases.

WHAT THEY ARE

Exposure of chemicals to the neutrons released by the fission of U 235 transforms them into unstable elements or compounds, the nuclei of which disintegrate slowly at a statistically predictable rate giving rise to radiation which can be detected by means of suitable instruments. Some of these disintegrate so slowly that an inventory can be kept on hand. Others decay so rapidly that they must be made up shortly before use.

The fission of U 235 itself gives radioactive fission products. These can be

2 Here the material is pulled out of the pile after completion of the bombardment period. The carrier block is pulled into a lead shield to protect workers from radiation while worker at right measures radioactivity of sample.

3 Radioactive iodine is chemically removed from its parent tellurium after it has decayed enough to permit handling. A helper is checking the radiation.

separated from the parent uranium, although the separation is quite difficult in most cases. Most of the fission products being made available are not salvaged by-products of the plutonium process but are items requiring special production from unprocessed irradiated uranium.

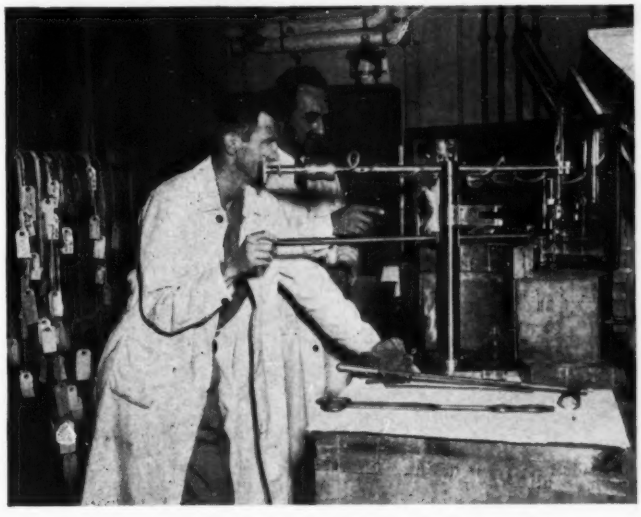
Over 400 radioactive isotopes are known, many of which were previously available in small amounts from the cyclotron. The atomic pile, being only a source of low-energy neutrons, cannot produce as large a variety as the cyclotron, but it yields tremendously greater quantities of those that it does produce.

It must be emphasized that no routine production system yet exists. The isotopes which are now available are the products of research and development.

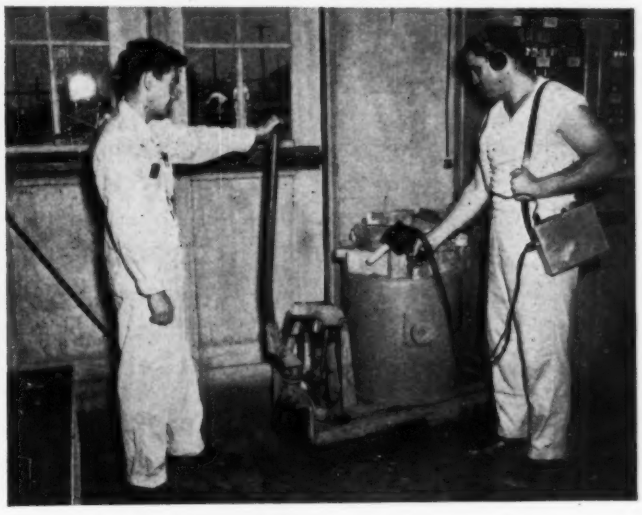
AVAILABLE ISOTOPES

The isotopes which are being prepared are divided into four groups, A, B, C and D, based on availability: A: usually on

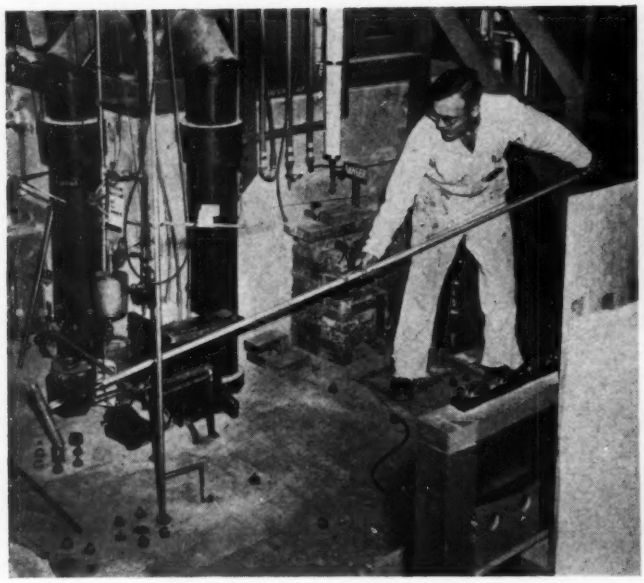
4 Experiments can be conducted in perfect safety while a pile reaction is going on behind the thick concrete shield. Radiation from hole No. 20 is being studied, but the other holes are plugged. The lead brick shield in the foreground absorbs the rays.



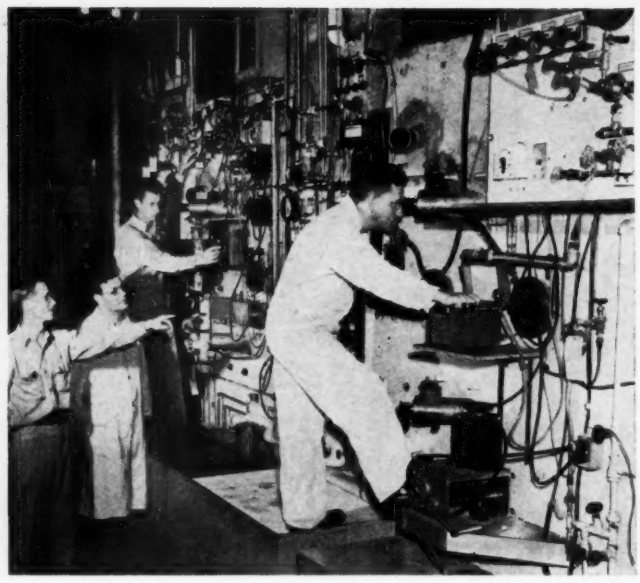
5 The bottle in the lead block can be opened and samples of radioactive material withdrawn by remote manipulation. The mirror enables the worker to view operations behind the shield.



6 Special lead containers are used to transport radioactive materials between laboratories. The one shown is almost solid lead. Note washable uniforms, film badges, and pencil-size radiation meters.



7 Material is taken from the pile to "hot" laboratories, where the isotopes are extracted. Here a sample is being introduced into a concrete-walled cubicle where reactions are remotely controlled.



8 Side wall of the cubicle whose roof is shown in photograph 7. The extraction operations, which are being controlled by the man in the background, can be observed through the periscope in front.

hand; B: often on hand, but cannot be stockpiled; C: experimental material seldom on hand; D: special difficult materials not on hand.

In group A are the following isotopes, indicated by the symbol and the atomic weight:

Zr	95	Ru	103,106
Cb	95	Te	127,129
Y	91	Na	24
Ce	141,144	C	14
Sr	89,90	P	32
Cs	137		

Group B contains the following:

Pr	143	I	131
Nd	147	S	35
Il	147	Cs	131
Eu	155,156	Co	60
Ba	140		

Group C contains the following:

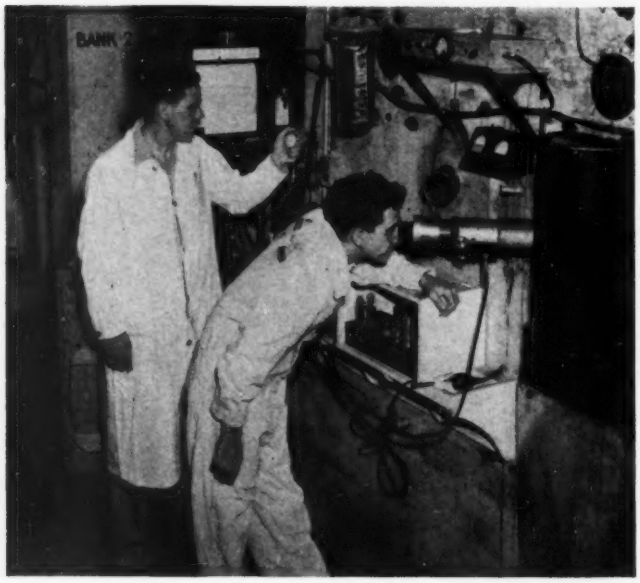
Cb	95	Cr	51	Cs	134
Ru	103,106	Fe	55,59	Ba	131
Te	127,129	Cu	64	Ce	141,143
Pr	143	Ga	72	Pr	142
Nd	147	As	76	Ta	182
Il	147	Br	82	W	185
Ca	41,45	Y	90	Ir	192,194
Ag	111	In	114	Au	198
Sc	46	Sb	122,124	Bi	210
		Te	127,129,131		

Group D contains the following:

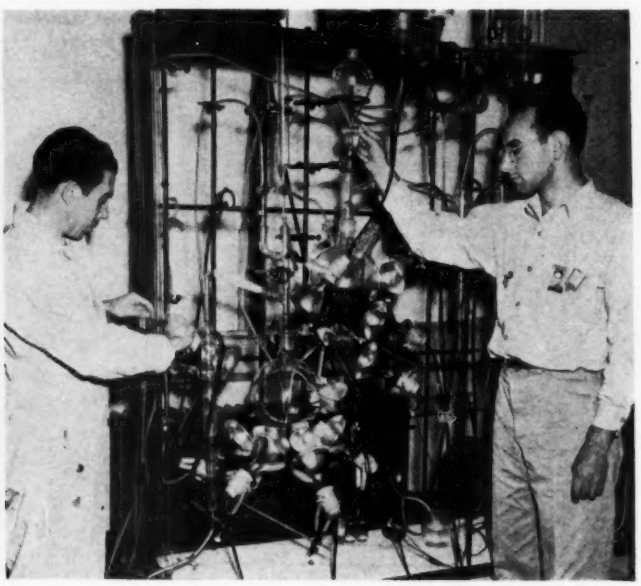
Cl	36	Rb	86	La	140
K	42	Sr	89	Eu	154
Ti	51	Zr	95	Os	191,193
Ni	59	Mo	99	Tl	206
Zn	65,69	Ru	103	As	77
Ge	71,77	Ag	108,110	Rh	105
Se	75	Cd	115	Au	199
		Hg	197,203,205		

Distribution will be supervised by an Advisory Committee on Isotope Distribution Policy, members of which were appointed by Major General L. R. Groves upon recommendation and nomination by the National Academy of Sciences. An interim committee has been set up, consisting of eleven representatives—two each from the five fields of science to which the isotopes are of especial interest, and a representative of the Manhattan District:

Physics: Lee A. DuBridge, University of Rochester; and Merle A. Tuve, Carnegie Institution of Washington; *Chemistry:* Linus Pauling, California Institute of Technology; and Vincent du Vigneaud, Cornell University Medical College; *Medicine:* Cornelius P. Rhoads, Memorial Hospital, New York; and Cecil J. Watson, University of Minnesota Medical



9 A similar view of a shielded fission product separation unit shows a reaction being observed and timed. Note the recording instruments behind the operators which permit careful control.



10 An extraction apparatus for use with highly radioactive pile products is tested before installation inside of one of the concrete-walled chambers, where the isotopes are purified.

School; *Biology:* Raymond E. Zirkle, University of Chicago; and A. Baird Hastings, Harvard University Medical School; *Applied Science:* Zay Jeffries, General Electric Company; and L. F. Curtiss, National Bureau of Standards; *Manhattan District:* Paul C. Aebersold, who was chosen to be secretary of the committee.

There are subcommittees, in addition, to take specific action on requests: an Advisory Committee on Allocation and Distribution, and a Subcommittee on Human Application.

Requests should in all cases be addressed to the Isotopes Branch, Research Division, Manhattan District, P. O. Box E, Oak Ridge, Tennessee. These should request application forms, price quotations, and any essential information not contained in the official notice, which is published in the June 14, 1946 edition of *Science,* a publication of the American Association for the Advancement of Science, Massachusetts and Nebraska Aves., Washington 16, D. C.

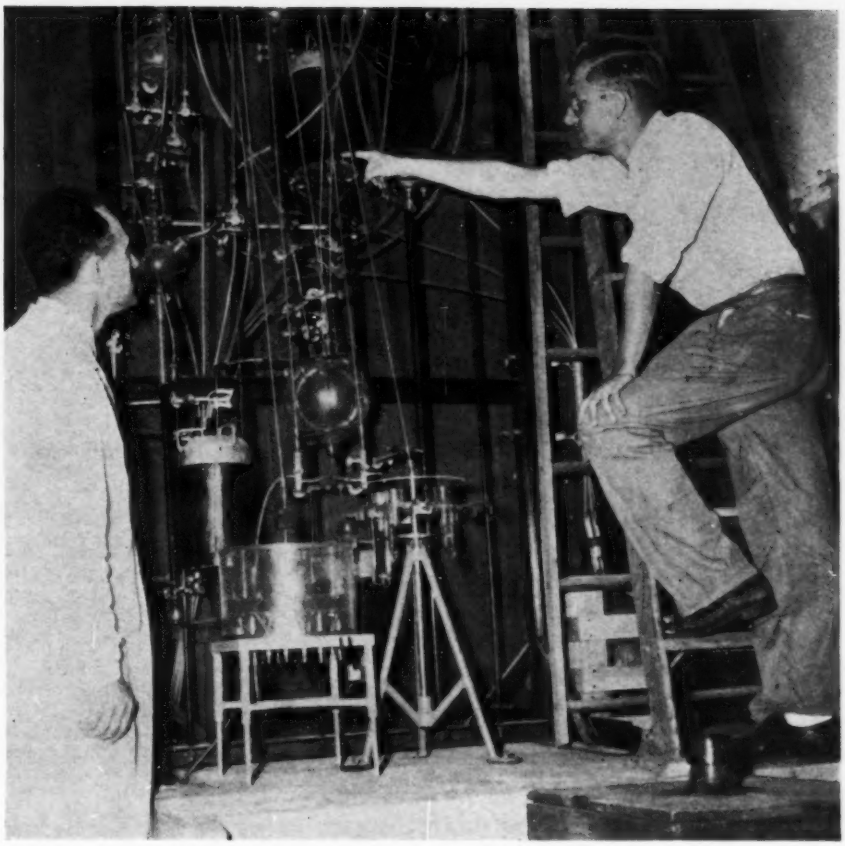
COST

Since the isotopes are not production items, it is difficult to assess clear-cut costs on these materials. Pending experience, they will be charged for at "out-of-pocket" costs; i. e., nonproject production and service, not including rental of facilities or general overhead on the isotopes program. Shipping costs will be borne by the requester. It is expected that the cost will be reasonably within the budget of research institutions.

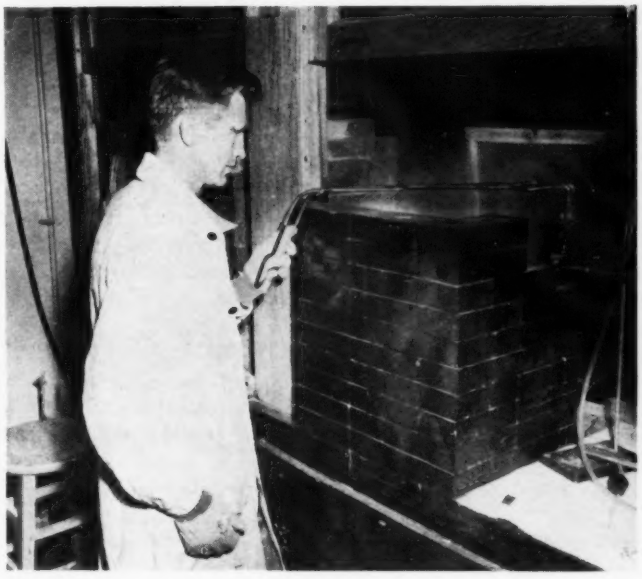
PRIORITY

Requests will be entertained only from accredited research groups, such as hospitals, universities, research laboratories including industrial laboratories, and clinical investigation groups. It is also stipulated that findings resulting from use of the materials be published or otherwise made available.

It will be impossible, until additional pile facilities are built specifically for isotope preparation, to meet all legitimate demands. In the meantime material will be allocated in the following order of priority: (a) publishable researches in fundamental sciences, including human tracer applications, requiring relatively small samples; (b) therapeutic, diagnostic, and tracer applications in human beings and publishable researches in the fundamental sciences requiring larger samples; (c) training and education by accredited institutions in the techniques and applications of radioisotopes; and (d) publishable researches in applied science. Allocation for routine commercial applications will be deferred for the present, until larger quantities are available.

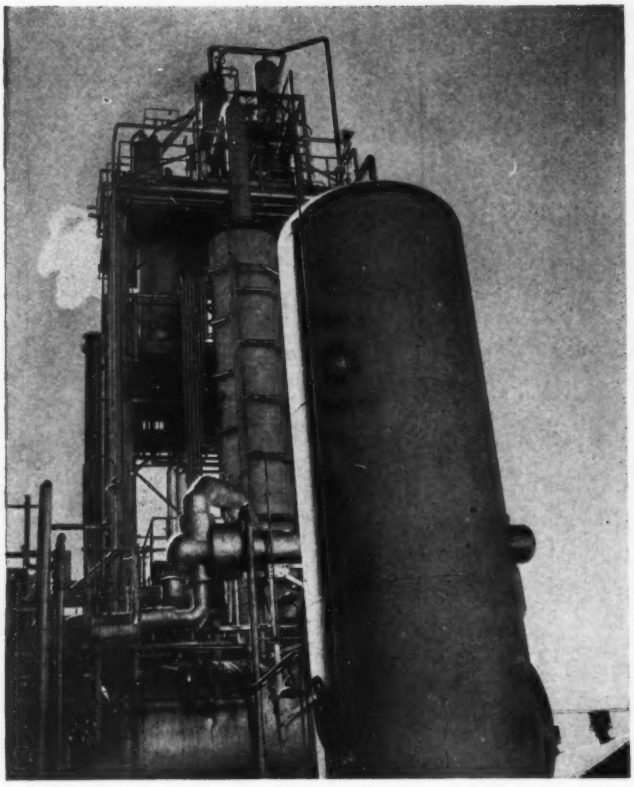


11 Another type of separation assembly (see photograph 10) is being installed behind a shield for testing. These assemblies are ingeniously contrived so that all transfers of materials and motion of parts can be controlled from the outside without danger.

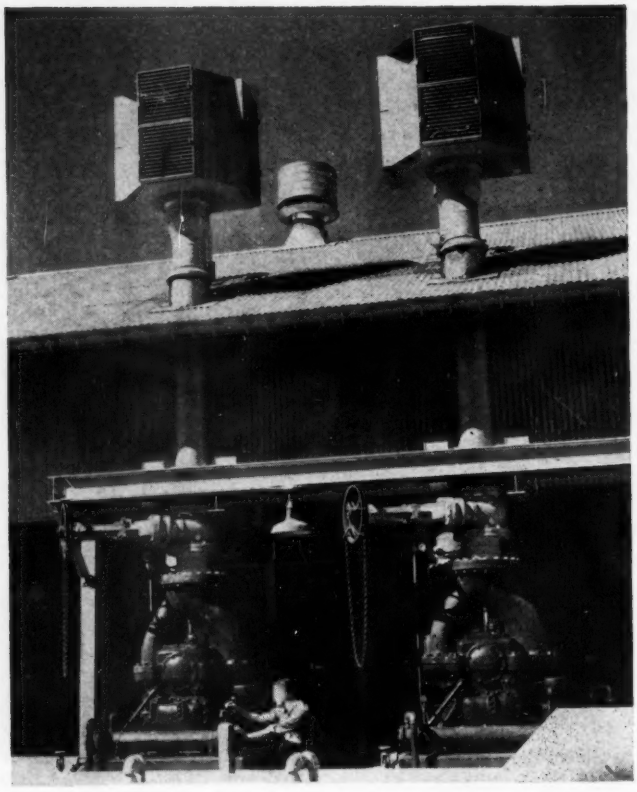


12 A purified sample of a radioisotope is evaporated to dryness in a beaker behind a wall of lead bricks. This is a so-called "semi-hot" sample—one which is not excessively radioactive.

13 Special shoes and clothing are worn in "hot" and "semi-hot" labs, and frequent checks with detectors are made in "cold" labs. Note the painted toes to differentiate shoes from streetwear.



Two distillation columns, connected in series, are required for the purification of the crude product as it comes from the box condensers.



These two compressors, connected in parallel and operating at 7600 revolutions per minute, supply all of the air required for the oxidation.

PHTHALIC ANHYDRIDE from o-XYLENE

EDITORIAL STAFF REPORT

PRODUCTION OF PHTHALIC ANHYDRIDE from petroleum ortho xylene instead of coal tar naphthalene marks an important milestone in the history of this chemical raw material. The process utilized for either raw material is basically the same—i. e., catalytic vapor phase oxidation of a hydrocarbon over a vanadium-based catalyst.

NAPHTHALENE was the sole raw material for the production of phthalic anhydride until production began at the $1,500,000 plant of the Standard Oil Co. of California for its chemical subsidiary, the Oronite Chemical Co. This plant, the first phthalic anhydride plant west of the Mississippi, was completed late in 1945 and utilizes ortho xylene as the raw material to produce 3500-4000 tons annually, about 5% of the national total.

ORTHO XYLENE

The ortho xylene for this process is produced as a petroleum by-product with a purity ranging from 85-90%. The plant for the preparation of the ortho xylene feedstock from the crude xylene cut was originally erected for the production of toluene during the war, but has since been converted for the separation of this material.

REACTION

Ortho xylene is fed from two 20,000 gallon tanks through a steam-heated vaporizer by individual gear pumps to each of the plant's eight identical process units where it is injected into the heated air stream at approximately atmospheric pressure. The air is supplied for this part of the process by two compressors running in parallel at 7600 rpm.

The ratio of air to the hydrocarbon stock as it enters the converter is dictated by the explosive limit of the mixture and is kept on the lean side to prevent the possibility of an excessive temperature rise which would result from an insufficient ratio of air to feedstock. This mixture is fed through a multiple tube converter where the formation of the phthalic anhydride takes place.

The converter consists of a bundle of tubes, catalyst-filled, cooled by a circulating bath of molten salt, whch holds the temperature of the catalyst above 1000°F. Heat is removed from the cooling medium by passing it through a waste heat boiler for steam generation. The time of contact with the fixed-bed catalyst, which is vanadium-based as in naphthalene oxidation, is less than one second.

PRODUCT

The product from the converters is first passed through coolers before entering the five large box-like condensers where the long white to tan straw-like crystals form on the sidewalls. These crystals fall into tapered bins from which they are collected. The waste gases from the converter are collected in a stack and burned.

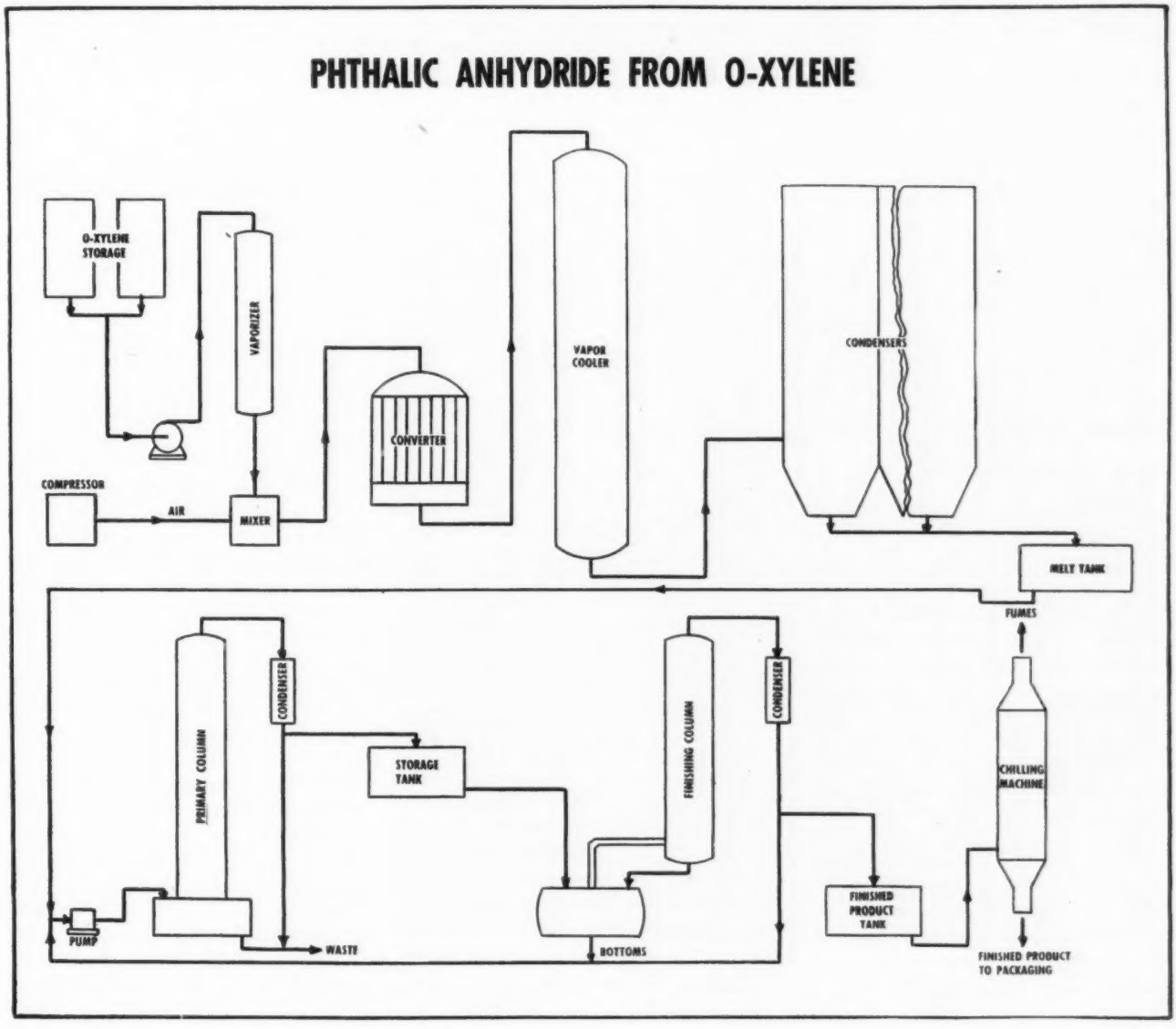
On a weight basis the actual yield of phthalic anhydride from ortho xylene

is over 70%, comparing favorably with that from naphthalene. The theoretical yield from pure ortho xylene is 140%, as compared to 116% from naphthalene. Carbon dioxide is the principal by-product of the oxidation process, although in some naphthalene conversions appreciable amounts of carbon monoxide are produced.

The crude crystals are periodically removed from the condenser boxes and transferred to an underground melt tank where closed steam coils are used for its liquefaction. The resultant molten material is then pumped to the first of the two distillation columns, which are operated in series. The center cut from the first still passes to the second from which the purified product is removed to an aluminum storage tank. The bottoms and heads from the first still are returned for reworking.

The still molten anhydride is then fed from the aluminum storage tank to a water-cooled stainless steel drum on which it solidifies. A doctor knife shaves the pure white solid from the drum, the flakes dropping into an automatic weighing machine for packaging in eighty pound bags for shipment.

Dumping crude phthalic anhydride from the bins below the box condensers prior to purification



CARBON PAPER

Improved Materials, Better Formulations, Mark Progress in this Specialty Field.

by ALAN B. OLSEN, Vice-president,
Wright Carbon Co., Cleveland, Ohio.

DURING RECENT YEARS THE MANUFACTURE of carbon paper has evolved from a secret art to become a sizeable chemical process industry. Herein the author highlights the growth of the industry, describes its raw material requirements, and discusses formulations and trends.

A SCANT fifty years ago the carbon paper industry was non-existent. For, prior to the turn of the century, it was believed that copies of all important business papers and documents should be hand written. The accepted practice was to use a copy writing ink, high in color, place the document in a press with a thin sheet of tissue backed by a damp cloth, to produce thereby a "legal" copy.

But as the pace of business quickened this archaic method gave way, of necessity, to the wider utilization of the then recently developed carbon papers. A new industry was born; an industry in which manufacturing processes were shrouded in secrecy, and formulating techniques were more art than science. Even now, carbon paper producers guard details of their processes jealously, but scientific methods have supplanted rule-of-thumb procedures, to bolster output, control quality, and to develop new products to meet particular needs.

RAW MATERIALS

As mass production techniques served o advance carbon paper manufacture from its inconspicuous beginnings to the status of a sizeable chemical process industry, more attention had to be paid to the chemistry of inks and the specific qualities of raw materials. Three such raw materials comprise the major tonnage requirements of the industry, namely, oils, waxes, and colors.

Theoretically speaking, the ideal carbon paper ink would be one made from a wax carrying color, and containing no oil. Such a formulation would not be practicable, however, in that a finished composition of this nature would be too hard to release an impression. Therefore a precise balancing of the three ingredients, oil, wax, and color, must be effected to yield an ink possessing the desired characteristics.

Oils are chosen for their non-drying properties because it is absolutely necessary that any oil used in a carbon ink formulation be resistant both to oxidation and drying. For the function of the oil is to produce softness and compactness in the ink, which controls the amount of ink deposited on the copy, and to some degree, its blackness. Should the oil have any tendency to dry the coated carbon sheet would harden and in due time would refuse to release a marking when used with pencil or typewriter.

Practically all non-drying oils have found use in the manufacture of carbon paper, to produce slightly different behavior characteristics. So important is the role played by oil in ink formulations, that were it not for the availability of certain selective vehicles it would be impossible to make some types of carbon paper—as for instance, those used in noiseless typewriters.

Wax is the complement of the oil in carbon inks, the particular purpose of which is to keep the ink sufficiently hard and dry at room temperature. Without waxes there could be no carbon inks, for no other compounds possess the requisite physical properties. One of the main qualities required in a wax is hardness, but acid content, crystal forming tendencies, and the ability to hold oils without "sweating" must also be considered.

Nearly every class of wax is employed, in some capacity, by the carbon paper industry, but the most important from a tonnage standpoint are the vegetable types such as carnauba, ouricury, and to a much lesser degree, candelilla. Mineral waxes, both mined and petroleum-derived, also find a place in ink compositions, together with limited quantities of insect waxes.

A primary function of the wax is as a "vehicle" for the color, and as a means of keeping the ink from soaking completely into the paper. However, too thick a coating cannot be applied, or difficulties will be encountered in the form of flaking of the ink film. Incidentally, the same waxes which give the best shine in polishes also act similarly in carbon paper formulations.

Color is, of course, the prime ingredient, for it is the color which is seen as the copy made from carbon inks. Essentially, it is the color which must be deposited as the "carbon copy" and the other component chemicals are used solely to facilitate depositing thin, opaque layers of color on paper.

All classes of colors are used in carbon paper inks, including carbon blacks, lake colors, toners, and dyestuffs. Even a jet black ink may well contain all these colors, for although carbon blacks possess a high degree of covering power, thin layers as transferred from a carbon sheet appear brown rather than black. Therefore, other colors and dyestuffs are incorporated as correctives to yield a truly black copy reproduction.

TECHNOLOGY

In view of the wax-like consistency of carbon ink, all equipment used in its preparation must be heated. Steam and hot water are usually preferred rather than direct flame, to avoid "burning" the colors.

The component chemicals are weighed into a jacketed kettle and mixed until the color is dispersed and the particles completely wetted out. Thereafter the ink is thoroughly ground in a roller or pebble mill and flaked into cakes in cold form. These cakes are re-melted as required for use in the paper coating machine.

Actual coating of carbon paper is a continuous process. The special tissue used, normally purchased in 200 pound rolls, is fed into the coating machine through tension bars to remove wrinkles and puckers, and passes over an inking roll which carries the melted paste ink from a heated fountain. The excess ink deposited on the tissue is immediately scraped off by means of a small diameter rod over which the paper is pulled.

After the application of an even layer of ink, of pre-determined thickness, the coated sheet is chilled by passing over a water-cooled cylinder. Modern machines can process twelve to fourteen miles of carbon paper daily—to closely controlled standards—a far cry from John Underwood's early experiments in which he hand-brushed greasy paste inks on ordinary paper.

So far nothing has been said of the tissue used in carbon paper manufacture, although this is one of the most important components. The paper used as the base for the ink ranges from 16 pounds per ream (20" x 30"—500 sheets) down to 4 pounds. This light weight tissue is about

the thickness of cigarette paper, which in spite of its thinness must be completely free from pinholes. Otherwise, in processing, ink could be forced through the paper and cause breakages by sticking to the chilling roll. Likewise, it is desirable to have paper rolls for coating with as few mill splices as possible, for such joints are potential sources of production troubles.

The chemistry of carbon paper compositions is involved, and determining the correct ink mixture to yield a certain end result or "write" is not easily accomplished. Very few exact rules exist on which to base expectations, and the empirical method must be relied upon to a considerable degree.

Hence, in developing new formulas, a great deal of time and effort must be invested to establish the merits of an ink. The usual procedure is to make a small batch of ink in the laboratory, and to conduct general experiments to appraise its promise. Then, a plant size batch must be made and used under regular coating machine conditions. Even then, a test made immediately after coating might well be misleading for most sheets show a greatly changed writing result after standing a few days, or, as a matter of fact, progressively as they age.

This ageing of carbon papers, in itself, presents quite a problem. Since all materials used in a carbon ink must be non-drying and chemically inactive, it would hardly be expected. The explanation of the phenomenon lies in the growth of wax crystals. When the sheet is freshly run, the crystals are slow in growing to their full size, and the contraction of the wax on cooling forces some of the oil to the surface with the result that the sheet is softer, and blacker writing, than it will be even a few days later. As time progresses, the carbon continues to get sharper and sometimes grayer in "write."

RECENT DEVELOPMENTS

Of late, considerable research has been devoted to building service into a sheet of carbon paper, permitting the use of the same carbon for the reproduction of twenty to twenty-five copies. In order to achieve this end it is necessary that a thinner and thinner layer of ink be removed from the carbon each time a copy is made, yet this thinner color layer must appear as a legible black reproduction. This can only be accomplished through balancing the colors of the spectrum to a truer black, and increasing the amount of pigment which can be added to ink formulas. Since the amount of color that can be added to an ink is limited by the fact that a melted ink must possess good flowing qualities, the wetting out of the color must be enhanced. Should the ink be heavy and viscous the surface of the carbon would be rough and uneven, and unsuitable for use.

The trend toward wider utilization of one-time-use carbon papers has also affected the industry's output during the past few years. Originally, such carbons were cheap, dirty products, made mostly from scrap materials, but currently they are made with the same quality control as the more expensive, and more durable, types. Too, within the past year many definitely improved inks have been developed, possessing qualities never before realized by the industry. These new inks give blacker writes, and yet are freer from "offset" dirt produced by the feed rolls of the typewriter. Increased quantities of color have been worked into the inks, to yield both greater service and sharper copies than has been possible heretofore.

Hectograph carbons have also chalked up sizeable gains. The older hectograph carbons—used on a gelatine pad—gave a limited number of weakly colored copies. Today, using a spirit duplicator, with alcohol as the solvent for the dyestuff, as many as 500 clear copies can be made directly from the master carbon.

A further research development now widely adopted is the treating of the back of carbon paper sheets to aid in resisting its tendency to curl. The present method is based on sealing the paper pores against varying weather conditions by means of a special wax or lacquer coating.

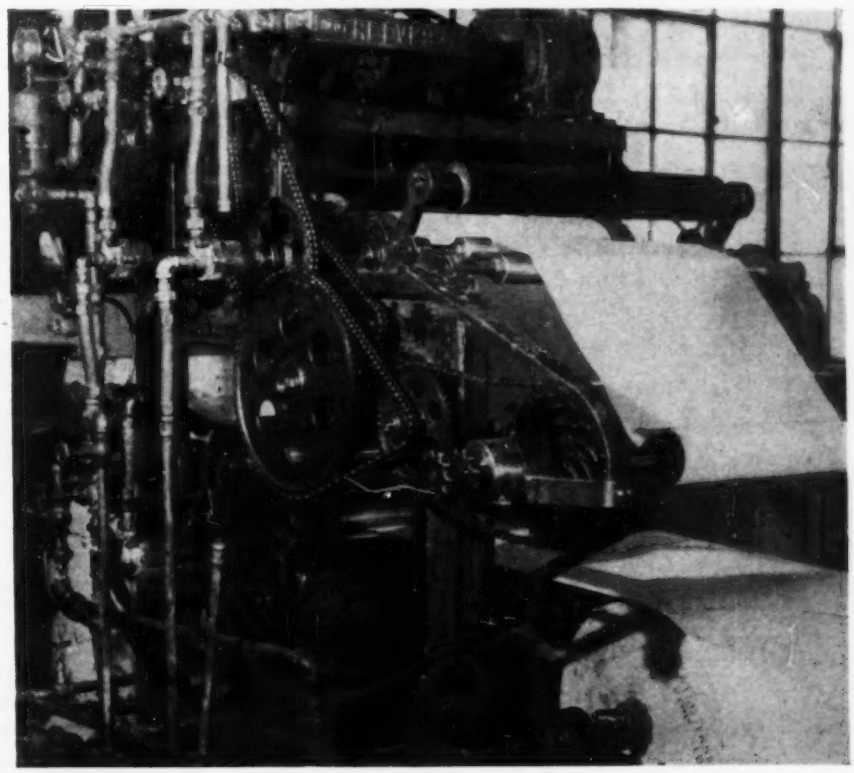
PROSPECTS

The carbon paper industry has grown steadily ever since its inception in the latter part of the last century, but during the past ten years, particularly, its scope has been expanded markedly. During the war, for instance, the government alone used more carbon paper than that manufactured by all producers in pre-war years. Too, every typewriter produced, every standard business form, aguments the carbon paper market. In fact, if one pauses to reflect on the role carbon paper plays in all business transactions, the ramifications, and promise, of the industry will be readily apparent. Manufacturers face the future confidently. Sales prospects are indeed encouraging.

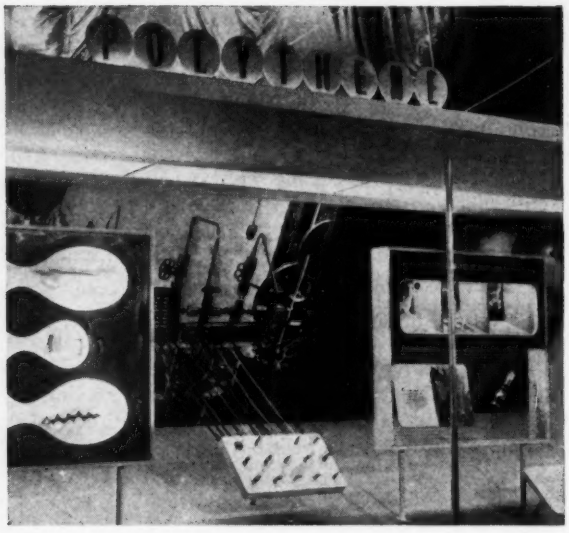
Some of the visionary possibilities of the industry have been partially explored during the war. If some day you receive your morning newspaper through your home "radio" unit, the ink will undoubtedly come from carbon paper. Mention is already being made of such reproductions, complete with three-color illustrations.

Too, with the arrival of the "air age", and rapid transit from one temperature extreme to another, special papers will have to be developed to meet such needs. That is, inks which will not melt in hot climates or harden in cold areas.

Although this problem has not been solved as yet, it is under investigation. The development of special lubricating oils designed to withstand such temperature changes has been accomplished. There is no doubt that, employing similar techniques, the carbon paper manufacturers will be ready to cope with the problem when it is posed.



Modern machines, such as the above, can produce 14 miles of carbon paper daily. The tissue is fed from the lower roll, passes through the inking mechanism, and is wound on the upper roll. Dual drives on the rolls are necessary to minimize puckering of the paper.



BRITISH CHEMISTRY

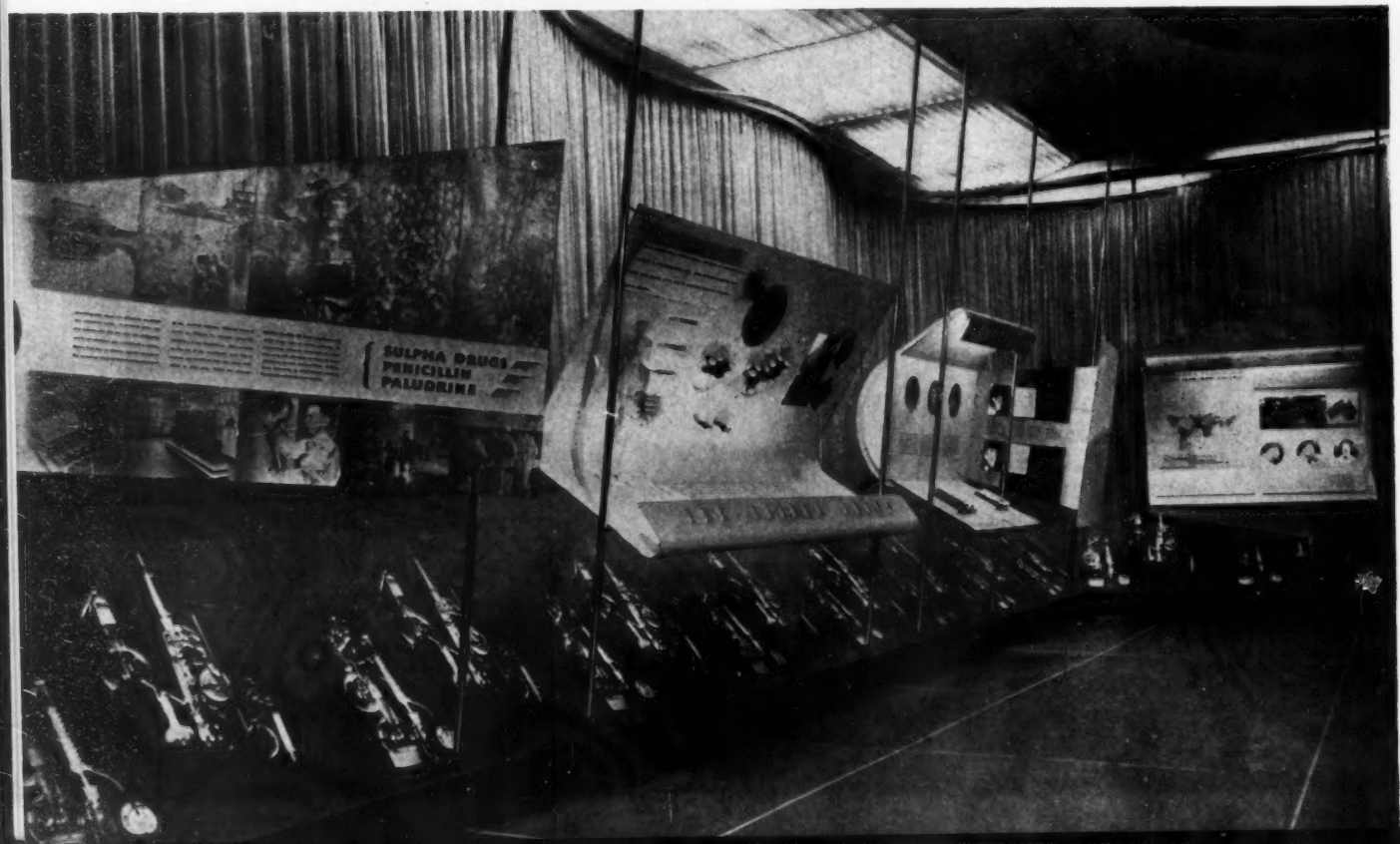
ICI mixes drama with research

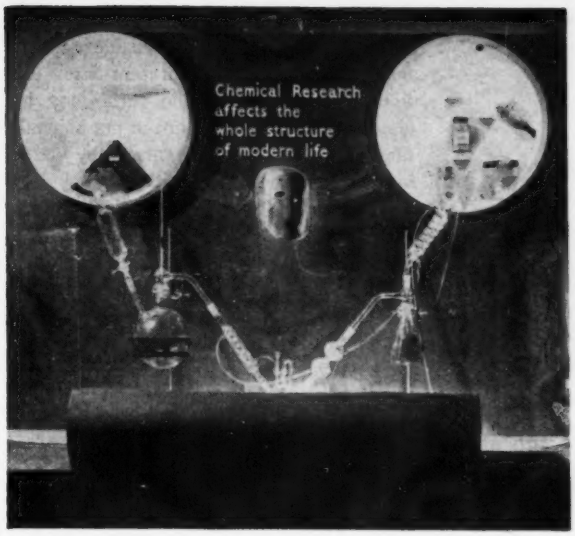
VIA a spectacular display of world's fair proportions, Imperial Chemical Industries Ltd. last month showed the British public what British chemical industry had accomplished during the war and what these accomplishments will mean in terms of peacetime applications. The exhibition was held at the Tea Centre on London's Lower Regent Street during the three weeks of June 5-28.

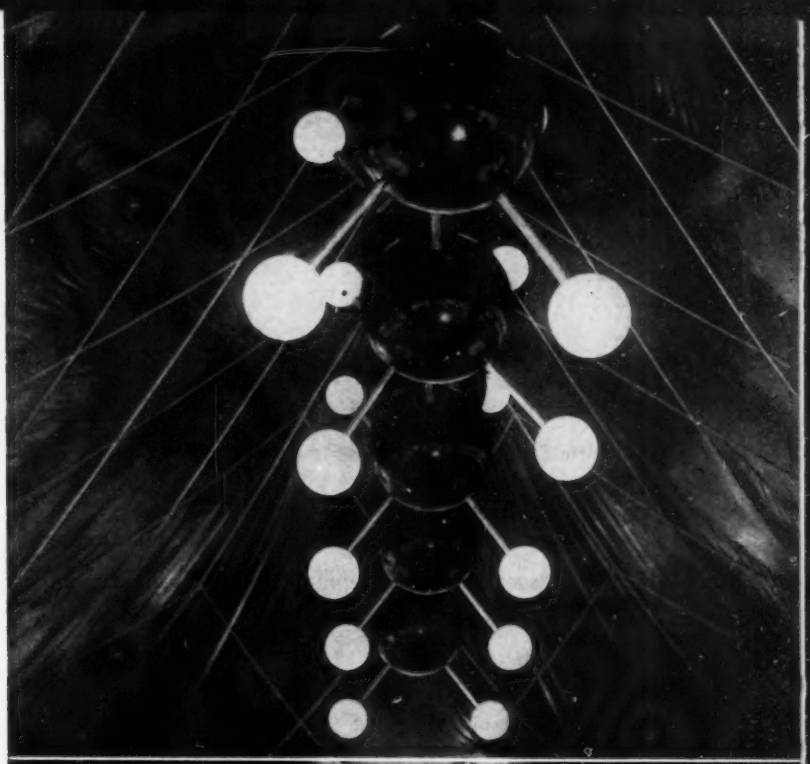
The exhibition was built around eight outstanding discoveries, either made or developed during the war period: the sulfa drugs, penicillin, Paludrine (anti-malarial), Methoxone (2 - methyl - 4 - chlorophenoxy - acetic acid, a selective weed killer), Gammexane (insecticide), Perspex

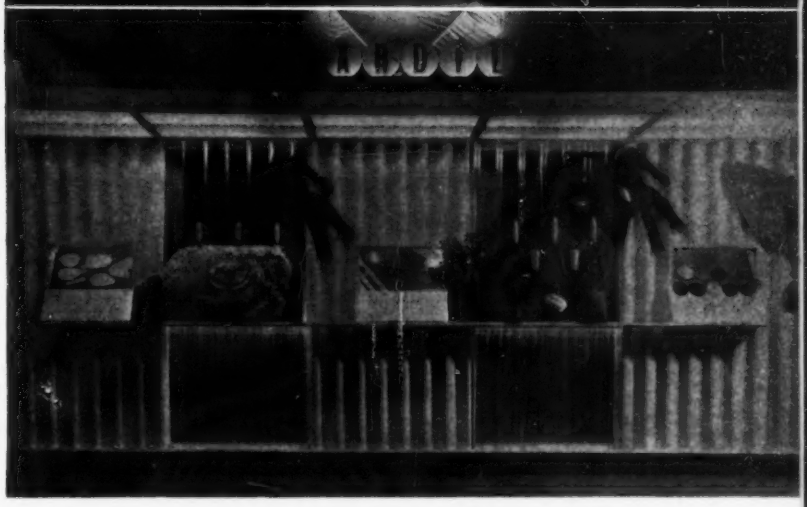
As the visitor enters the Chemical Research Exhibition he is greeted by this impressive example of modern paper sculpture.

The "Chemist versus Disease" section of the Exhibition features penicillin, sulfa drugs, and Paludrine, new anti-malarial.









DISPLAYS ITS WARES

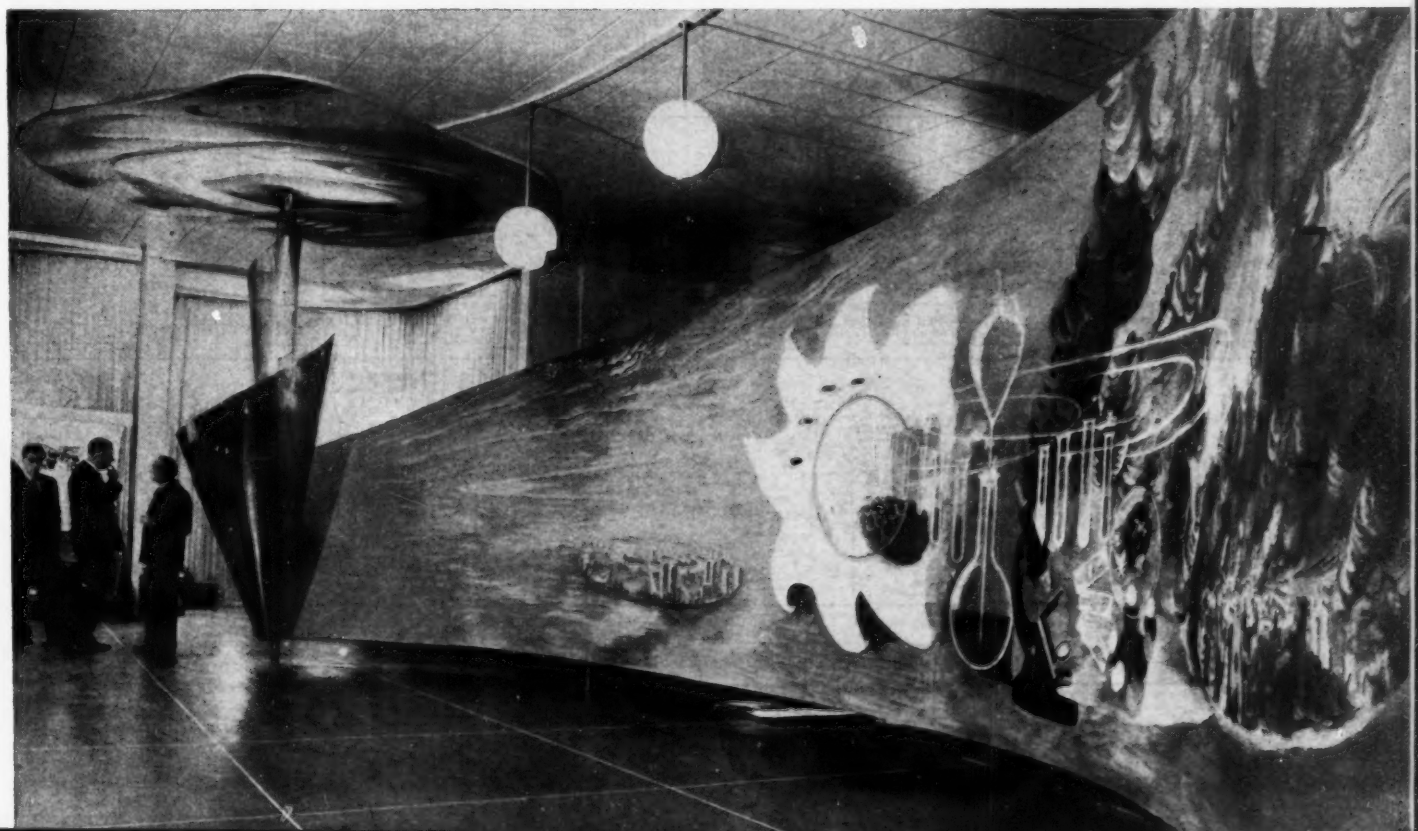
to stage a spectacular show

(methyl methacrylate), Polythene (polyethylene plastic), and Ardil (peanut protein fibre). "All the discoveries included in the exhibition," states the program, "were made by British chemists during the fifteen year period 1930-45."

An outsanding feature of the Exhibition was the striking and dramatic manner in which the products and their applications were presented. Photographs, models, symbolical representations, and three-dimensional arrangements were employed in unusually effective fashion to get away from the traditional stereotyped bottle displays of chemicals.

A striking central mural by John Hutton depicts the harnessing of chemistry's wartime achievements to the uses of peace.

Huge symbolic molecules adorn the upper hall above a display featuring Ardil, a wool-like, moth-proof fibre from peanut protein.



RUTIN From BUCKWHEAT

EDITORIAL STAFF REPORT

RUTIN, FORMERLY OBTAINED IN LOW YIELDS from relatively high-priced tobacco, is now made more economically from buckwheat. Over 10,000 pounds of it will be made by at least four pharmaceutical houses for further investigation of its use in high blood pressure, hemorrhage and other conditions associated with capillary fragility where it appears helpful.

THE DARK BROWN color of tobacco is due to pigments formed by the oxidation of rutin; and tobacco was the best source of this material—albeit a poor one—until very recently.

During the past two years scientists at the U. S. Department of Agriculture's Eastern Regional Research Laboratory, in Philadelphia, have been developing a process of extraction from buckwheat leaves, in which rutin occurs to the extent of two to three per cent.

Two processes have been devised for extracting the rutin, which is a complex flavone glucoside, from the dried leaf: one depends upon extraction with hot water, in which rutin is soluble to the extent of 5.5 g. per liter; the other, on alcohol extraction. While it is still too early to assess the comparative costs of these processes, officials of the Laboratory believe that major interest will center on the hot-water process which is described in the accompanying flow sheet.

Three 20-minute extractions of the buckwheat leaf meal with hot water remove 97 per cent of the rutin. The filtered and concentrated extracts are treated with an equal volume of alcohol to coagulate the proteins and colloids. It is again filtered, concentrated to drive off the alcohol, and the crude rutin allowed to crystallize. Two recrystallizations give the final product. If objectionable alcohol-insoluble materials are present after the first recrystallization, the rutin may be dissolved in a small amount of hot alcohol, filtered, and the alcohol replaced by water in a vacuum evaporation step.

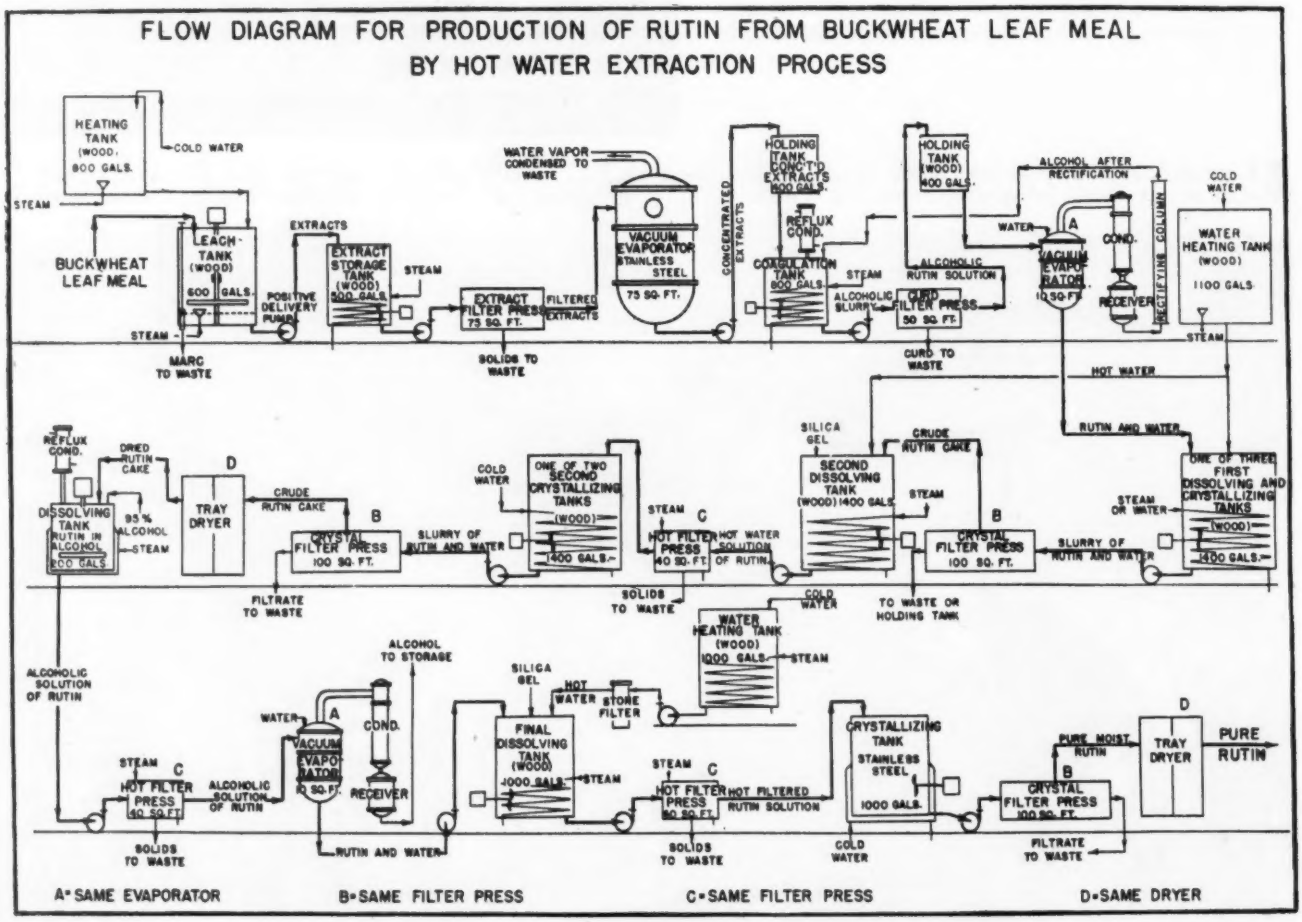
The alcohol extraction process differs in that 70 per cent alcohol is used; the meal is given three 12-hour extractions; the curd-removal step is unnecessary; and the final product must be extracted with benzene to remove fats.

The advantages of the water process are threefold: (1) no equipment for mixing and storing alcohol is required, and the recovery problem is greatly reduced; (2) the fire and health hazards of working with alcohol and benzene are eliminated; and (3) the cycle is much shorter. Against these are the disadvantages that more filtration and evaporation area—and consequently, more operators—are required.

PROSPECTS

The potential domestic demand is said to be 1,300,000 lbs., for use in preventing and treating conditions arising from capillary fragility. Two years ago 25 lbs. were made; last year four pharmaceutical houses produced 400 lbs.; production this year is expected to top 10,000 lbs., and several pharmaceutical manufacturers in the East and Midwest are planning manufacture.

FLOW DIAGRAM FOR PRODUCTION OF RUTIN FROM BUCKWHEAT LEAF MEAL BY HOT WATER EXTRACTION PROCESS



No. 8 of a series on
INFORMATION SOURCES FOR CHEMICAL MARKET RESEARCH

Services and Publications of THE U. S. DEPARTMENT OF AGRICULTURE

by RICHARD M. LAWRENCE*
Development Department, Atlas Powder Company
Wilmington, Delaware

THIS great Department's motto, "Agriculture is the Foundation of Manufacture and Commerce," applies with considerable force to the chemical process industries, for "the nation's greatest industry," agriculture, together with forestry, offers a wealth and variety of raw materials and vast markets for many chemical products.

Department of Agriculture records and forecasts of crop and livestock production and prices are therefore of keen interest to chemical market researchers. Seasonal factors in many lines—paint oils, naval stores, linters, soap fats, fertilizers, and insecticides—are an inherent characteristic of their connections with the agricultural economy. So, too, is the price behavior of many agricultural products, an important proportion of which are supported by loan or purchase guarantees.

Agriculture requires immense quantities of chemicals for the production of foods, feeds, and fibers. Figures on farm income closely measure the prospective demand for fertilizers, the largest single outlet for the number one chemical, sulfuric acid. Figures on acreage of vegetable, grain and fruit crops are of interest to industries selling insecticides, seed disinfectants, and related chemical products.

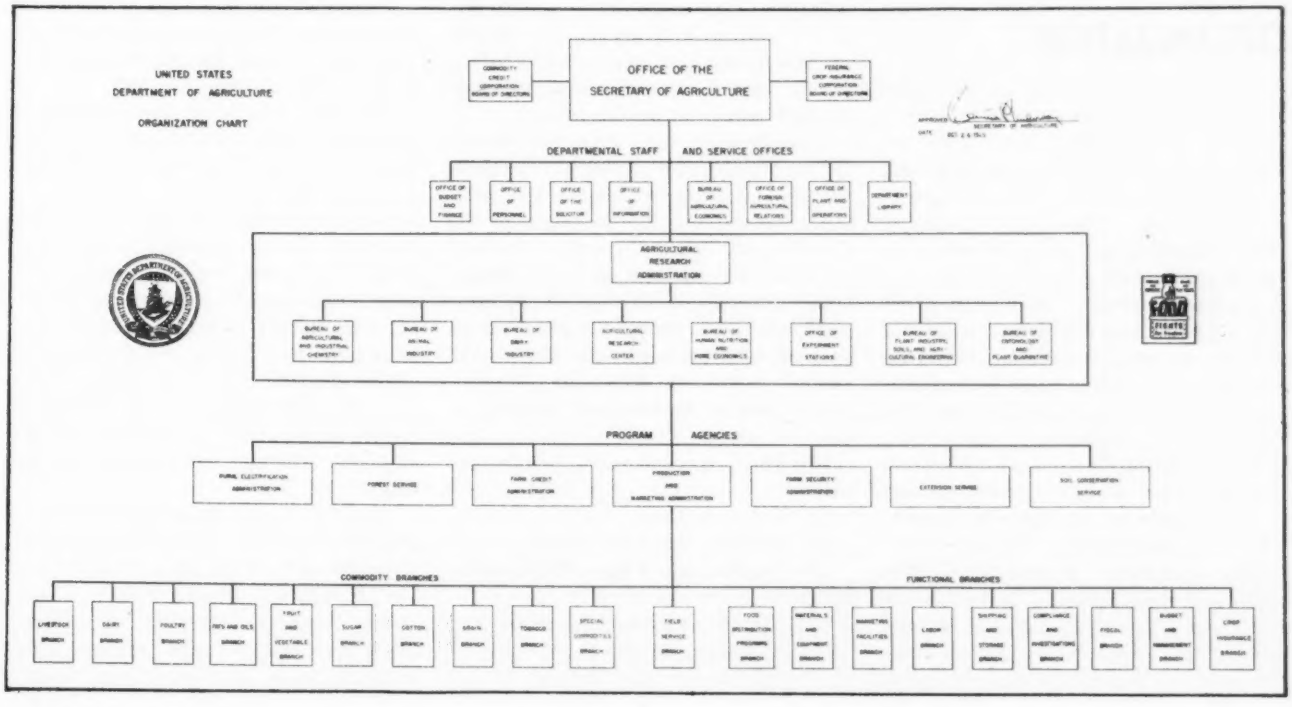
The agricultural situation is also fundamental to the demand for cattle feeds and stock remedies and large sectors of the markets for glass containers, salt, and paints. The AAA program has importantly increased the demand for superphosphate and limestone.

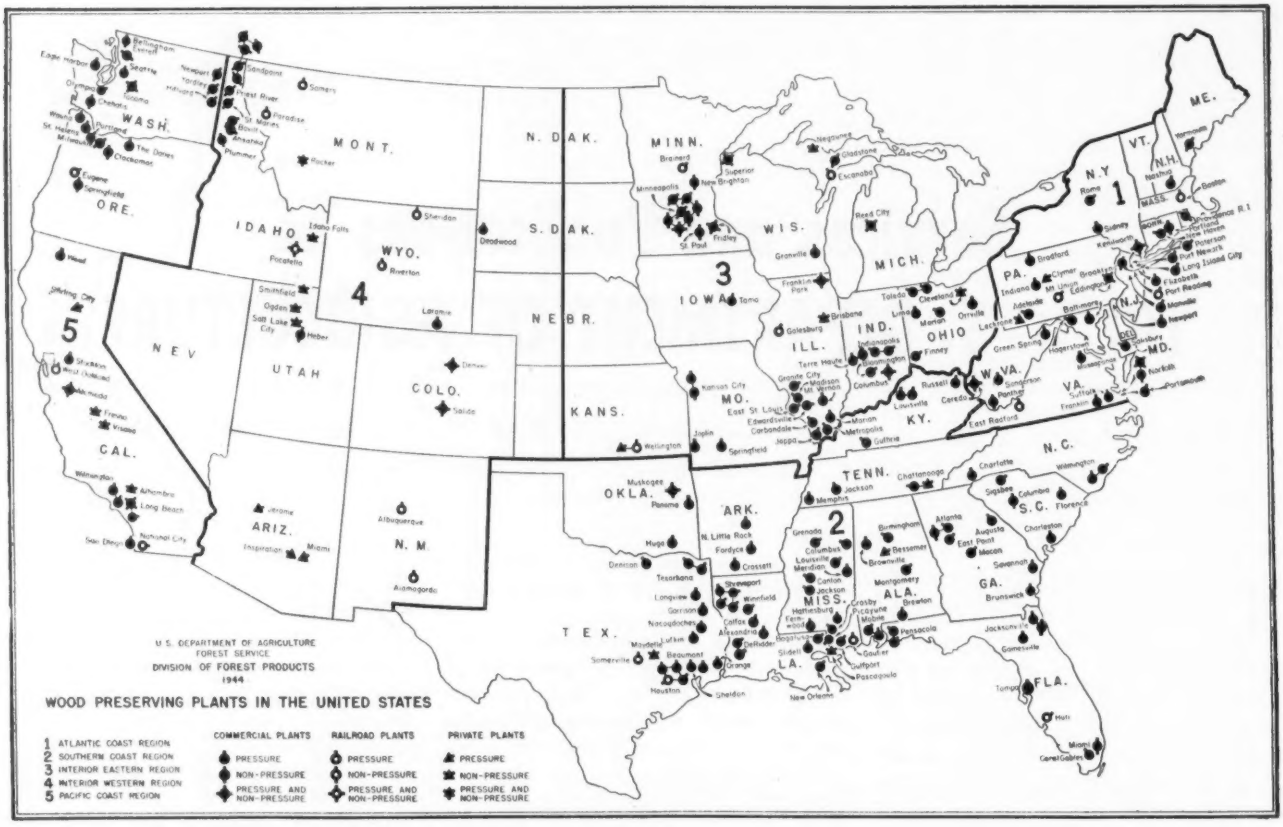
The food industry is increasingly adopting equipment of the chemical process industries and consumes great quantities of chemicals and allied products for food processing, packaging and preservation.

Examples of connections between the chemical process industries and agricultural raw materials are numerous, involving hides for the leather tanning industry, grains for the starch and distilling industries, molasses for alcohol, milk for casein, cottonseed and soybeans for the vegetable oil producers, wood pulp and linters for such cellulose products as rayon, plastics and smokeless powder, beeswax and lanolin for cosmetics, and cane and beets for the sugar refiners. Forest products supply raw materials for paper and rayon, wood chemicals and charcoal, dynamite, plastics and linoleum.

Research is continually developing the ties between agriculture and industry. Chemical technology is rapidly increasing interchangeability between the various fats and oils, intensifying the intercommodity competition between cottonseed, corn, soybeans, copra, and palm-kernels.

* The author acknowledges with gratitude the cooperation of Peter DeVries, Mrs. Florence Kandiner, Donald J. Lehman, J. F. Thackrey and others of the U. S. Dept. of Agriculture who supplied material for this article.





This competition is complicated by the fact that U. S. fats and oils are largely by-products of foods, feeds, and fibers while tropical oils are produced as main products.

Through its many regular and special reports, the Department of Agriculture releases a vast volume of information on every phase of the agricultural economy, including many activities of the processed food industry. Many statistics are available by regions, states and counties; coverage of foreign agriculture is becoming increasingly detailed.

ORGANIZATION

The Department of Agriculture exercises immense responsibilities for collecting and disseminating information on every phase of farm and forest activities, be it soils or fertilizer, finance or transportation, food grading or processing, prices or packaging. The Department enforces many laws and regulations governing insect pests and plant diseases and carries out numerous programs involving farm quotas and price supports. Both its scientific and economic research programs are noteworthy for their vast scope and high level of achievement.

Also noteworthy, and on a greater scale than that of any other government agency, is the Department of Agriculture's system of cooperation with every type of organization interested in agriculture from State government units to Universities to 4-H Clubs. The backbone of the Department's organization for getting information from and to the farmers—and typical of its cooperation methods—is the 3,000 County Agents, each of whom is an employee of his state and county as well as of the Department.

The Department of Agriculture, with its great scientific and technical staffs and laboratories, ranks easily among the world's foremost research organizations. Its chemists alone have published over 10,000 papers.

As indicated in the accompanying organization chart, the Department of Agriculture comprises eight staff and service agencies and eight research and program agencies. This article is concerned primarily with a staff agency, the Bureau of Agricultural Economics (BAE), which is the central statistical and economic research agency of the Department.

A major part of the BAE services are for the purpose of providing data to guide the other bureaus in planning the many operating and research programs of the Department. These important relationships will be indicated in the following brief outline of the activities of the principal bureaus, a number of which carry on work of great importance to chemical market researchers. These are:

(1) Agricultural Research Administration

(2) Rural Electrification Administration

(3) Forest Service

(4) Farm Credit Administration

(5) Production and Marketing Administration

(6) Farm Security Administration

(7) Extension Service

(8) Soil Conservation Service

Two other well-known agencies formerly in the above list are the Food and Drug Administration and the Weather Bureau, which were transferred out of the Department of Agriculture a few years ago. Also "missing" are the Agricultural Adjustment Agency (AAA) and the War Food Administration, which were consolidated with other Department of Agriculture bureaus in 1945.

1. *The Agricultural Research Administration* (*ARA*) includes seven of the Department's older scientific bureaus and agencies concerned with research and regulatory work, the four Regional Research Laboratories, the nine Bankhead-Jones Laboratories, and the Agricultural Research Center at Beltsville, Md.

(1a) The Bureau of Agricultural and Industrial Chemistry is devoted to chemical research on the development of broader outlets for agricultural products for both food and industrial uses. (1b) The Bureau of Animal Industry, which operates a large number of field stations and laboratories, broadly studies the problems of livestock and of animal products and administers such laws as the animal quarantine acts and the Virus-Serum-Toxin Act. (1c) The Bureau of Dairy Industry carries on a variety of research, regulatory and informational activities in its field.

(1d) The Agricultural Research Center, Beltsville, Md., provides facilities for about ten units of the Department. (1e) The Bureau of Human Nutrition and Home Economics (HNHE) deals primarily with problems of the ultimate consumer, in foods, clothing, shelter, house-

hold equipment, and family economics.

(1f) The Office of Experiment Stations administers the Federal grants to the States for agricultural research and assists in co-ordinating the cooperative work between the Department and the State experiment stations.

(1g) The Bureau of Plant Industry, Soils, and Agricultural Engineering, with headquarters at the Beltsville Research Center, maintains field stations and works with State agricultural experiment stations in many parts of the country. It investigates plant breeding and the improvement of soils and fertilizers. Among its best known achievements are the introduction of such valuable foreign plants as soybeans, Acala cotton, and sugar cane resistant to mosaic disease (which revived the Louisiana sugar plantations after this disease brought them to disaster about 1925).

Among the most significant economic studies ever made of the fertilizer industry are the "Grade Surveys," published at intervals since 1919 by the Department of Agriculture or the National Fertilizer Association or both in cooperation. These exhaustive reports present the consumption of each grade of fertilizer and have recorded the steady gains in plant-food content, along with the increasing tonnage.

The most popular grade in both 1941 and 1943 was 2-12-6, accounting for about 11% of all mixed fertilizer tonnage. The 3-8-3 grade, which was number one in 1934, has since been virtually eliminated from the market by more concentrated mixtures. These reports also reveal the changing positions of nitrogen, phosphorus, and potash. Figures are broken down by states, between which there are many striking contrasts. The latest report printed by the USDA was Circular 689, "Fertilizer Consumption in 1941 and Trends in Usage" by A. L. Mehring and Grace P. Vincent. Other recent reports by Mr. Mehring show the close correlation between farm income and fertilizer purchases of the following year. A number of important USDA studies of phosphate rock and superphosphate have been published in recent years by K. D. Jacob, principally in technical journals.

The Regional Laboratories have inaugurated a series of comprehensive economic and commercial surveys to supplement their scientific and technical surveys.

(1h) The Bureau of Entomology and Plant Quarantine (EPQ) conducts research investigations on insects, gives advice on how to control the injurious ones and how to utilize those that are beneficial, cooperates with State and local agencies to control and prevent the spread of injurious insects and plant diseases, and is responsible for the enforcement of Federal plant quarantines and restrictive orders to prevent the introduction or spread within the United States or its territories of injurious insect pests and plant diseases.

2. *The Rural Electrification Administration,* chiefly through loans to cooperative associations, promotes electrification of rural areas.

3. *The Forest Service* promotes the best use of the country's forest resources along three major lines. It administers the national forests, assists States and private owners in improved forest management practices, and conducts research on every phase of forestry. The chemical industry is well acquainted with the Forest Products Laboratory at Madison, Wis., the world's first and still foremost institution in its field. In its great nation-wide survey, in progress for over 15 years, the Forest Service is developing a detailed inventory of all present and potential forest resources.

Statistical reports of the Division of Forest Economics, of which E. C. Crafts is Chief, are of two main types, those dealing with the forest resources and those dealing with the production, distribution, consumption, and prices of forest products. In the first classification are statistics obtained through the nation-wide Forest Survey, which cover forest land areas, timber volumes, rates of growth, and rates of drain on the forest resource through industrial and domestic uses, windfall, fire, disease, and other costs.

Among progress reports issued in connection with the Survey are titles like "Primary Wood-Products Industries in the Lower South" and "Forest Resources of the North Louisiana Delta," and a number of special maps. These include data on sawmills, pulp and paper mills, and naval stores operations and the prospective supplies of their raw materials.

Another comprehensive progress report is "Timber Requirements of the Hardwood Distillation Industry," by M. H. Haertel (1938), which interestingly traces the fortunes of charcoal, acetic acid, wood alcohol and allied products over a 40-year period. Among similar reports is that on "Naval Stores" (1941).

Periodical statistical publications include several which are advantageously carried on in cooperation with other organizations. Probably the best known of these, and an outstanding example of government-industry cooperation, is the annual report, "Quantity of Wood Treated and Preservatives Used in the United States," compiled by R. K. Helphenstine, Jr., of the Forest Service in cooperation with the American Wood-Preservers' Association. For over a third of a century, this report has measured its industry in terms of preservatives consumed, lumber treated, and processes employed, with detailed geographic breakdowns. It presents very interesting data on treating plant capacities, the competition between domestic and imported creosote, and the position of products like Wolman salt, chromated zinc chloride, and zinc meta arsenite. A new feature of recent years is a set of figures on the use of fire-retardant chemicals such as "Protexol," "Minalith" and borax-boric acid, which incidentally totaled over 20,000,000 lbs. in 1943.

Other Forest Service statistical reports, prepared in cooperation with the Census Bureau, cover annual lumber production, lumber distribution and consumption (biennial), and stumpage and log prices (annual). In cooperation with the War Production Board (now the Civiilan Production Administration) reports are issued on monthly production and quarterly stocks of lumber.

The Forest Products Laboratory, housed in this modern building at Madison, Wisconsin, is under the supervision of the U. S. Forest Service of the Department of Agriculture.

4. *The Farm Credit Administration* makes loans to farmers and cooperative organizations to facilitate production and marketing of agricultural products.

5. *The Production and Marketing Administration (PMA)* carries out a great variety of production and marketing programs, including price support, subsidy, lending, buying, selling, storage and transportation of farm products. It also determines food allocations, collects and disseminates market news, and conducts inspection, grading, and standardization activities. Other broad responsibilities include programs connected with the Agricultural Adjustment Act, the Federal Crop Insurance Act, the Sugar Act, the Commodity Credit Corporation, and the Federal Surplus Commodities Corporation. PMA comprises ten commodity

branches and ten functional branches.

6. *The Farm Security Administration* assists individuals to become farm owners through loans and rural rehabilitation work.

7. *The Extension Service* makes the results of Department research and service for practical farm application available to farmers by a variety of methods.

8. *The Soil Conservation Service* administers a national program of soil and water conservation and improved land use.

BUREAU OF AGRICULTURAL ECONOMICS

The BAE is the Department's fact-finder in agricultural statistics, in prices, demand and supply, costs and income, marketing, transportation, manpower, credit, taxation, land and water utilization, rural welfare, and other aspects of agricultural production and distribution. Its research, analyses, forecasts, and interpretations provide the basic information needed by the Department in forming national administrative policies. Many special reports are also prepared for other government agencies.

The Bureau of Agricultural Economics comprises nine divisions: Agricultural Finance, Economic Information, Farm Management and Costs, Farm Population and Rural Welfare, Land Economics, Marketing and Transportation Research, Statistical and Historical Research, Program Analysis, and Development and Program Surveys.

O. V. Wells, Chief of the BAE, has risen through the ranks of the Department of Agriculture, having joined the Department staff in January, 1929, as junior economist. Mr. Wells became chief of BAE on May 15, 1946, succeeding Howard R. Tolley, who went to the United Nations Foods and Agriculture Organization as chief economist and director of its Division of Economics and Marketing. Mr. Wells was promoted to his present post after extended service as assistant chief of BAE, in charge of price and marketing work.

The BAE staff of 2,000 includes statisticians, clerks, and a large number of economists who are experts in various branches of agriculture and marketing. This highly organized team annually turns out 600 or 800 comprehensive statistical reports—an average of at least two every day. Elaborate efforts are made to see that BAE statistics and results of its researches are made available and easily understood. Attractive charts, maps, and diagrams are a very helpful feature of its numerous reports.

Literally reaching to the grass roots, the BAE crop reporting service involves the cooperation of 400,000 voluntary crop reporters. A substantial share of the fact-collecting and fact-analyzing work of this Bureau is carried on through its regional offices, through the offices of the agricultural statisticians who are cooperatively employed by the Bureau and the State Governments in many States, and through an office at Chicago and two cooperatively sponsored regional statistical laboratories. These offices gather and make partial tabulations of data which are further combined, in Washington, into national summaries. However, a few studies, of such nature that they primarily affect only one or two regions, are carried through to completion within the regional offices. For example, a study in the North Central States showed that if lime were applied on the soils that need it, the increase in production would be equal to the present output of 16 million acres of cropland and 12 million acres of pasture. A similar calculation on the use of fertilizer applied in quantities recommended by agricultural experiment stations showed that production in the region could be increased by the equivalent of 12 million acres of cropland and 3 million acres of pasture. The BAE has taken the leadership, while cooperating with State experiment stations and with other agencies, in making forward estimates each year of the capacity to produce individual farm products in each of the 48 states. These studies served as background for the building of production goals.

Statistical Methods. "The Crop and Livestock Reporting Service of the U. S. D. A.," issued in 1933, describes the methods used in collecting and analyzing statistical data on crop and livestock production and related subjects. This document is now available only in incomplete form.

Of considerable interest to market researchers are the BAE's remarkable sampling techniques. Their master sample, comprising 3 groups of 100,000 farms each, is an accurate cross section of the "agricultural universe" of 6,000,000 farms. Using this miniature replica of "all farms," statistics collected economically and rapidly from only 1½ to 5% of them reliably represent the national picture. Strict comparability of data is another valuable feature of the master sample, which will accurately register year-to-year trends—often more significant than the absolute quantities involved.

Another sampling technique is the measurement of crop frontage on fixed auto routes to yield data for estimating total crop acreage.

Interest in price ceilings has increased the number of requests for cost data. This field of work, one of the oldest in the Bureau, had already developed a backlog of research results that were continually used in the war effort. The 20-year-old series of cost of producing cotton contains such cost items as labor, farm power, fertilizer, seed, abandonment of planted acreage, and rents. Figures have been recently revised and will soon be used as a basis for an index measuring relative costs year by year.

These examples illustrate some of the progress made toward extending the completeness and availability of information on agricultural statistics. The continuing program of statistical work calls for the distribution each year of more than 8 million schedules to farmers and others, and the tabulation of more than 2 million schedules.

Incidentally, the BAE booklet, "Preparation of Statistical Tables—A Handbook," presents valuable suggestions based on experience in preparing millions of tabulations.

OFFICE OF FOREIGN AGRICULTURAL RELATIONS

This office collects and disseminates information on agricultural developments abroad, including both spot news and long-range studies of crop and livestock production, price trends, stocks, imports, and exports. Information is assembled through cooperation of a world-wide network comprising U. S. Foreign Service men (agricultural attaches and consular representatives) and traveling specialists of the USDA, foreign Ministries of Agriculture, international agricultural organizations and published reports, both governmental and private.

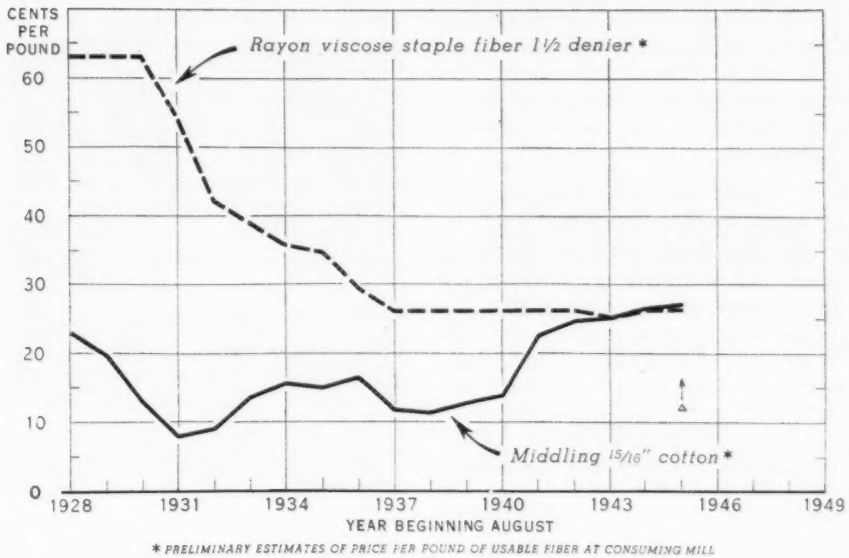
PUBLICATIONS

The Crop and Livestock Reporting Service of the BAE includes an extensive program of periodic reports, in accordance with a schedule of release dates fixed at the beginning of the year, on crop production and related information. (For a complete list, see "Schedule and Contents of 194— Crop and Livestock Reports," issued the first week of each year.)

These reports contain the current estimate of crop acreage and prospective yields of the Crop Reporting Board, along with comments on conditions. They show yield per acre and indicated production for the important crops, and follow the crop production situation through from prospective plantings to actual plantings and harvest. Late in the year, an annual summary is published, showing acreage, yield, and production of principal crops by States, with comparisons for earlier years. Other reports deal with livestock and livestock products, and a large number of special commodities. Much of the information shown in these reports is summarized quarterly in the statistical periodical "Crops and Markets," which also includes market statistics. "Agricultural Prices" is a monthly report presenting prices received by farmers for principal crops and livestock products, index numbers of prices received by farmers, indexes of prices paid by farmers for articles bought, and parity prices.

There are about a dozen "Situation Reports" which give a rather complete picture of the supply, demand, price and outlook for each of the more important farm products. Tables and charts present cur-

COTTON AND RAYON: EQUIVALENT PRICES OF RAW FIBER, UNITED STATES, 1928-45



rent figures on acreage, yield, production, market movement, stocks, consumption, and prices, and also comparisons with other significant periods. Of considerable interest to the chemical industries are the monthly "Fats and Oils Situation," and the annual "World Sugar Situation." Other useful publications are "The Demand and Price Situation," "The Marketing and Transportation Situation," and "The Farm Income Situation," all monthlies.

The Agricultural Situation (monthly) presents commodity reviews and short special articles. The January, 1946, issue had interesting comments on the intense inter-commodity competition between burlap (jute), cotton and kraft paper in bags for agricultural products and supplies.

It should be pointed out here that for those who are concerned with the most recent information on production, utilization, value, and prices, the crop and livestock reports will be of most interest. But for those who are willing to wait a few weeks, and who wish an analysis and interpretation of the current economic problems of agriculture as well, the "Situation Reports" will be of more value.

Other publications which are of more indirect interest to the chemical industries are: the "Agricultural Finance Review," issued annually; "The Farm Real Estate Situation," annually; "Current Developments in the Farm Real Estate Market," prepared every four months; and "Farm Population Estimates," published annually.

A somewhat different type of report is found in the series of annual reports and summaries relating to individual commodities, known as the "Outlook" reports. These were originally developed as a result of efforts to provide late each fall the information needed by the Extension Service and other agencies whose members would be discussing production plans and programs with farmers during the winter and spring months. They make available the conclusions of experts as to probable developments in production of crops and livestock and as to probable price relationships.

The U. S. Department of Agriculture publishes most of the primary statistics on agricultural raw materials. The Bureau of Agricultural Economics compiles most of the data on acreage, production and prices at the farm level. The Production and Marketing Administration furnishes some of the information on processing and on prices in central markets.

The Office of Foreign Agricultural Relations has primary responsibility within the Department for data on foreign agricultural production and our foreign trade in farm products. The Census Bureau, a unit of the Department of Commerce, compiles the original production statistics on a number of types of processed agricultural commodities and compiles the basic data on foreign trade of all kinds. The Census of Agriculture, conducted every five years by the Census Bureau, provides other interesting basic data.

In addition to the reports issued directly by the BAE, the Bureau cooperates in such regular publications as the annual "Agricultural Statistics," the standard and most complete of the reports of the USDA. One of the outstanding reports of all government agencies, this volume brings together the most important series of statistics prepared in the Department or compiled by the staff for official use. It includes estimates of acreage, prices, and values of all crops, usually with detailed figures by States and for some foreign countries. Production, utilization, consumption and price data are included for a wide variety of derived products such as lard, vegetable oils, oleomargarine, glycerin, turpentine, sugar and molasses. Figures on soil conservation, fertilizer, liming materials, insecticides and fungicides are also included, with data on payments under agricultural conservation, agricultural adjustment, and parity programs. It includes conversion factors (lbs. per bushel, etc.) for principal commodities.

The Bureau of Plant Industry has issued a number of reports with exhaustive compilations and analyses of fertilizer consumption and expenditures by States.

The Bureau of Agricultural and Industrial Chemistry prepares the Annual Naval Stores Report, with figures on production, distribution, consumption and stocks of turpentine, rosin, and related products. Midyear reports are also issued, as well as figures for the end of the first and third quarters. Helpful background publications are the Forest Service's "Naval Stores Handbook" (1935) and "Timber Requirements for Naval Stores" (1941).

Among studies of foreign agriculture are "The Agriculture of Cuba," which includes a thorough analysis of the sugar industry.

NEW SERIES OF COMPILATIONS

At the request of organizations and agencies directly concerned with production and distribution of processed feed supplies, the Bureau began collecting monthly data on the production and distribution of meat scraps and tankage from about 450 plants during 1944-45. These data indicate that production of meat scraps averages about 50,000 tons per month; of tankage, a little more than 18,000 tons per month.

A report, "Statistics on Commercial Peanuts, by months and seasons, 1938-1944," published during 1945, brought together for the first time monthly statistics on farmers' stocks of peanuts in commercial positions, stocks crushed, and stocks milled. Statistics on fruit production and utilization for the period 1934 to 1944 were combined in one report during 1945.

A war-time analysis of protein feed deficiencies and the recovery of feed from distillers' and brewers' grains made by the Bureau was of material assistance in stimulating the recovery of feed from grains used to produce industrial alcohol.

INFORMATION BY SPECIAL ARRANGEMENT

The current reports received by the Department of Agriculture in some instances lend themselves to special analyses to meet special needs. There is available a large volume of information which can be tapped for the purpose of making special tabulations and analyses of special

topics or areas other than those for which data are published. The major limitation is that voluntary reports, like most compulsory reports, are considered confidential by the agencies that collect them, and, therefore, information that would disclose individual operations cannot be made available to anyone.

No formal arrangements provide for special surveys in collaboration with trade associations or other organizations. In a number of instances such surveys can be made, but arrangements must be made directly with the agency of the Department of Agriculture that is to make the survey.

MEETING FUTURE NEEDS

The agencies responsible for wartime agricultural programs found in the census reports and the current reports on agriculture a starting point which provided a large part of the required information. In many instances, administrative needs called for more detail than had previously been necessary for statistical purposes, and it became expedient to broaden the reporting scheme already in operation. In other cases, information which had previously been relatively unimportant became important because of the regulation of the product.

The series of reports on agricultural statistics, which had been useful to a large section of the business, community, and agricultural interests before the war, provided a large part of the information required during the war, and the statistical programs were modified so that the need for collecting entirely new information was held to a minimum. Changes were made, some elements of the work were entirely abandoned, others were streamlined, still others were expanded, and many new items of information were developed.

THE LIBRARY

The Department library, with over 500,000 volumes and thousands of periodicals and bulletins, is organized to gather information published in all nations. It is the world's greatest collection an agriculture, food, and related subjects and includes a huge collection of statistical reports. The library has an impressively high rate of circulation of its vast "working capital".

To provide prompt accessibility to this great storehouse of information, the library staff of 200 includes a number of specialized consultants and bibliographers. Services are multiplied through the microfilm and photoprint copying facilities and the field libraries in about 30 cities. Methods for ordering microfilm service are explained in *Chemical Abstracts* 40 (January 10, 1946).

The comprehensive monthly, "Bibliography of Agriculture" ($4.50 per year), lists all of the literature received by the library and covers more than 12,000 periodical and serial publications, as well as thousands of books, pamphlets, and government documents. The library also prepares hundreds of special bibliographies and indexes, of which recent titles include: "Pulpwood in the Lake States," "Guayule," "Vanilla," "Soybeans," "Dichlorodiphenyltrichloroethane (D D T)," and 'Index to Agricultural Economics Literature."

LOCATING AND ORDERING PUBLICATIONS

Titles of Department of Agriculture publications are listed in a variety of catalogs, indexes, and bibliographies, of which the first to be consulted is the "List of Available Publications of the USDA," which is arranged by subjects and elaborately indexed. It is supplemented by the Department's "Monthly List of Publications and Motion Pictures." For locating publications which are out of print, reference should be made to the exhaustive quinquennial "Indexes to Publications of the USDA," of which the latest issue covers 1936-40.

The BAE catalog, "Agricultural Economic Reports and Publications," published in September, 1944, is supplemented by a monthly "Check List of printed and processed (non-periodical) publications," which also includes maps and charts.

Reports and Periodicals on Marketing and Distribution is a catalog of the regular and special reports of the Office of Marketing Services, including Market News Reports and other publications of interest to the food trade.

Photographic prints of many illustrations, maps and charts appearing in Department publications are available at nominal prices from the Office of Information, U. S. Department of Agriculture, Washington 25, D. C., and should be ordered by listing the figure number, title number and date of issuance of each publication. Remittances for such material should be made payable to "Treasurer of the United States."

The Superintendent of Documents' Price Lists on agricultural and related subjects cover all reports in stock, but titles of those which are out of print must be looked up in the various USDA indexes.

Most USDA publications are free of charge, the usual rule being "one each of not more than 10 publications." Requests should be sent to Division of Publications, Office of Information, U.S.D.A., Washington 25, D. C. Publications for which prices are listed should be ordered from the Superintendent of Documents, Washington 25, D. C.

The Department is pleased to add names of interested parties to its mailing lists for serial and occasional reports on many subjects. A great deal of obscure material, such as certain processed reports which do not appear in the usual catalogs and indexes, can be obtained in answer to inquiries addressed to the Office of Information of the U.S.D.A.

In addition to the vast volume of information released in the many official publications of the Department, staff members also publish numerous papers in scientific and technical journals. These include papers published by professional societies, trade journals, State universities and other agencies cooperating with the Department in the conduct of investigations, and many of them represent outstanding contributions to an understanding of agricultural economic and technical problems. The Department library maintains an exhaustive index of these publications.

CHECK LIST OF PUBLICATIONS INVOLVING CHEMICAL AND ALLIED INDUSTRIES

(a—annual, q—quarterly, m—monthly, w—weekly)

USDA Catalogs

List of Available Publications of the USDA. (Misc. Pub. 60)
Monthly List of Publications and Motion Pictures
MP 443 List of Publications of the USDA (1936-40)
Indexes to Publications of the USDA: 1901-1925; 1926-30; 1931-35; 1936-40.
Agricultural Economic Reports and Publications of the BAE (Sept. 1944); monthly supplements.
Census of Agriculture Handbook, Uses of Agricultural Census Statistics.
Reports and Periodicals on Marketing and Distribution, OMS.
Published Information on Foreign Agriculture. January 1937 to December 1944.

Superintendent of Documents Price Lists

PL 38—Animal Industry
PL 43—Forestry
PL 44—Plants
PL 46—Agricultural Chemistry, Soils and Fertilizers
PL 68—Agricultural Statistics, Marketing, etc.

Circulars

C 129—Survey of the Feertilizer Industry. P. E. Howard. (1931) 5¢
C 138—Baking Powder and Baking Chemicals. (1940) 5¢
C 185—New Fertilizer Materials. A. R. Merz. (1931; revised 1940)
C 315—Changes in Composition of American Fertilizers, 1880-1932. A. L. Mehring and A. J. Peterson. (1934)
C 436—Production and Agricultural Use of Sodium Nitrate. A. R. Merz and C. C. Fletcher. (1937) 5¢
C 487—Selecting Fertilizers. A. R. Merz. (1938; revised 1940) 5¢
C 578—Production and Agricultural Use of Ammonium Sulfate. C. C. Fletcher, A. R. Merz, and B. E. Brown. (1940)
C 668—Composition of Paper and Paperboards manufactured in 1939. (1943) 10¢
C 679—Production and Fertilizer Use of Urea. A. R. Merz and B. E. Brown. (1943) 5¢
C 689—Fertilizer Consumption in 1941 and Trends in Usage. A. L. Mehring and Grace P. Vincent. (1943) 10¢
C 718—Double Superphosphate. A. L. Mehring. (1944) 10¢

Miscellaneous Publications

MP 77—American Medicinal Plants of Commercial Importance
MP 143—American Fertilizers. P. E. Howard. (1932)
MP 171—Crop and Livestock Reporting Service of the USDA. (1933). Methods of reporting and analysis.
MP 203—Cotton and Cottonseed: List of Publications of the USDA. Rachel P. Lane and Emily L. Day (1934)
MP 209—Naval Stores Handbook. (1935)
MP 242—Development and Use of Standards for Grade, Color, and Character of American Cotton Linters.
MP 327—Motor Fuels from Farm Products. (1938) 15¢
MP 400—Sources and Available Supplies of Commercial Fertilizers. (1940) 5¢
MP 441—Cottonseed: Official Grading and Market News.

Forest Resources and Industries

MP 309—North Louisiana Delta. (1938) 20¢
MP 429—Upper Michigan. (1941) 20¢
MP 501—Georgia. (1943) 25¢
MP 519—Louisiana. 25¢
MP 533—North Carolina. (1944) 25¢; Northern Idaho. (1942) 30¢
MP 552—South Carolina. (1944)

(Turn to page 148)

HEADLINERS in the NEWS

A. ALLAN BATES, who formerly headed Westinghouse's chemical and ceramic research, has joined the Portland Cement Association as research vice-president.

W. H. McCONNELL, named director of sales, Diamond Alkali Co. With Diamond since 1929 he spent most of his time in the Mid-West until transferred to Pittsburgh.

F. M. ANABLE, advanced to the post of assistant to the vice-president, Victor Chemical Works, Chicago. He has been production superintendent at Chicago Heights.

SIDNEY M. CADWELL, appointed director of research and development of U. S. Rubber Co. He has been engaged in rubber and plastics research for twenty-seven years.

R. C. WICKERSHAM, named vice-president, Tar and Chemical Division, Koppers Co. Inc. Affiliated with Koppers since 1916, he was appointed assistant vice-president in 1944.

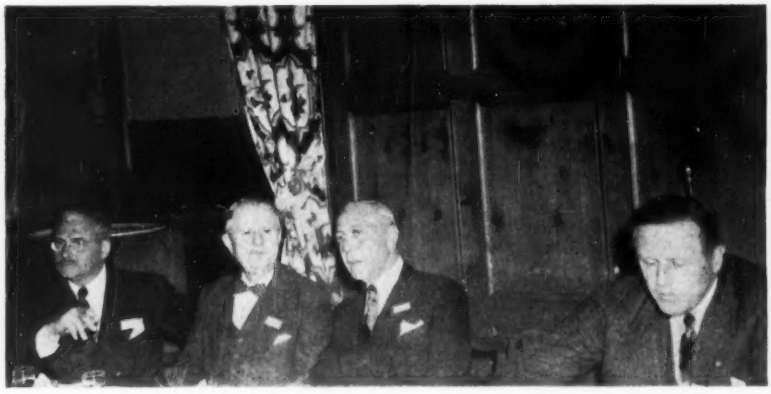
G. F. D'ALELIO, has joined Industrial Rayon Corp. as manager, high polymer research. Long active in the plastics field, Dr. D'Alelio, has 230 patents issued in his name.

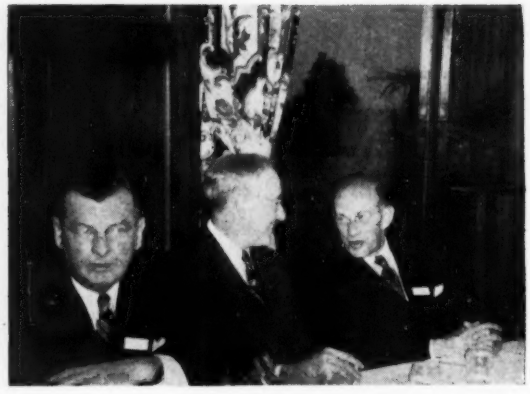
CARL H. POTTENGER, formerly a sales executive with American Cyanamids's plastics division, has joined Pennsylvania Coal Products Co., Petrolia, Pa., as vice-president.

LINUS PAULING, director of Gates and Crelin Chemistry Laboratories, Cal. Tech., awarded the 1946 Willard Gibbs Medal in recognition of his research achievements.

MCA Meets

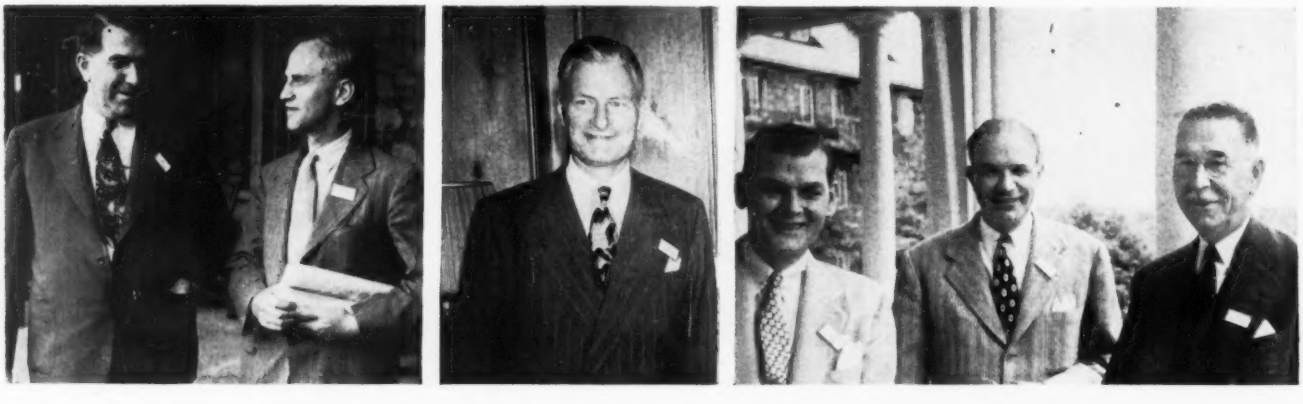
Meeting at Skytop, Pa. on June 6, members of the Manufacturing Chemists' Association expressed confidence that their business will continue at high levels during the rest of this year, with even greater chemical demand foreseen for the future. However, severe competition in export markets is to be anticipated, according to H. L. Derby, retiring pesident, with the Allied Control Council planning German chemical production in 1949 at some 60 per cent above 1936. He also pointed out that a major percentage of German chemical plants are in the Russian zone of occupation.
Pictured at right are: Lammot du Pont, vice-chairman, executive committee; Ralph E. Dorland, president, Synthetic Organic Chemical Manufacturers' Association, and Charles S. Munson, U. S. I. Chemicals, MCA president.





Pictured in the conventional order: W. S. Landes, Celanese Corp.; L. T. Beale, Penn Salt; H. O. C. Ingraham, General Chemical; Geo. Merck, Merck & Co.; John L. Smith, Pfizer; C. D. Marlatt, Martin Dennis Co.; and C. R. Mudge, E. I. du Pont de Nemours.

Left to right: Wm. Stieh, Metalsalts; Geo. Merck; Judge Wm. H. Speer; Harry L. Derby, Lammot du Pont, and Geo. W. Taylor, former chairman War Labor Board and now with the University of Pennsylvania, who stressed the need for labor-management cooperation.

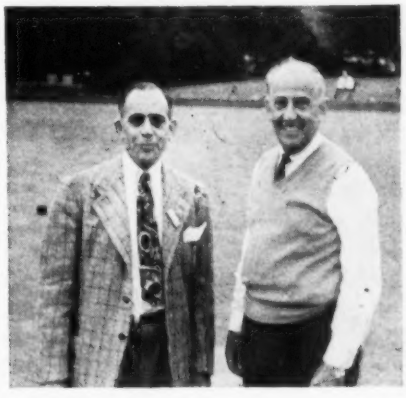


T. P. Callahan, Monsanto, and CI contributing editor, chats with L. L. Hedgepath, Pennsalt. Center, P. M. Dinkins, Jefferson Chemical. G. W. Dolan, Mathieson Alkali; D. W. Drummond, Mathieson Alkali; and W. I. Galliher, Columbia Chemicals.

At left, E. H. Killheffer, du Pont; "Doc" Dorland, Dow Chemical, and D. B. Curll, Commercial Solvents Corp. Right, Donald B. Keyes, Heyden Chemical, turns photographer with W. I. Burt, B. F. Goodrich Chemical Co., as his subject.

E. E. Lincoln, du Pont, and P. A. Singleton, Monsanto, discuss chemical economics. In the group at right, R. H. Giebel, Harshaw Chemical; unidentifed guest; W. J. Harshaw, Harshaw Chemical, and M. M. Biddison, General Chemical, tot up golf scores.

Bowlers W. B. Plummer, Standard Oil (Indiana); and Chaplin Tyler, du Pont. Center, Jim Boyd, Phillips Petroleum. Right, J. P. Remensnyder, Heyden Chemical; and Geo. A. Anderson, Chas. Pfizer, in action on the greensward.

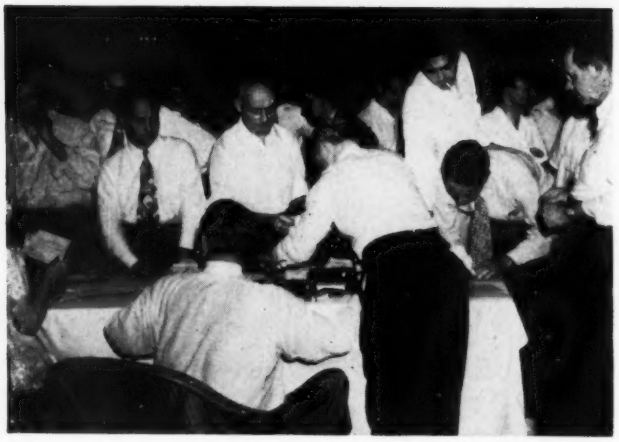


A. L. Loebenberg, Allied Chemical; Robert Le Baron, Oronite Chemical; E. B. Benger, du Pont; W. W. Duecker, Texas Gulf Sulphur; E. J. Boehm, National Aniline Co., and L. W. Miller, Barrett Co., enjoy Skytop's bucolic surroundings.

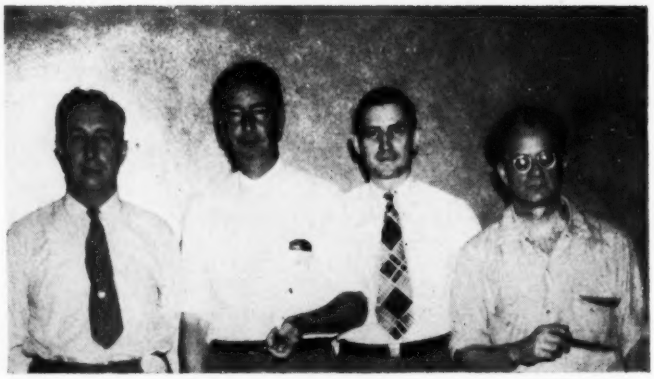
NAIDM Convention

More than three hundred members of the National Association of Insecticide and Disinfectant Manufacturers met at French Lick, Indiana, June 17-19 to discuss problems and prospects in their field. With the thermometer standing at 98, informality was the rule, and even enthusiastic golfers downed clubs in favor of the swimming pool.

Particularly evident was the intra-industry competition looming. DDT and pyrethrum each found supporters, with 666 being accorded serious consideration. Aerosol bomb type insecticides were enthusiastically lauded by one school: their significance minimized by others. The advantages of quaternary ammonium compounds, phenolics, and chlorine were also debated, as real competition between these materials appears in the immediate offing.



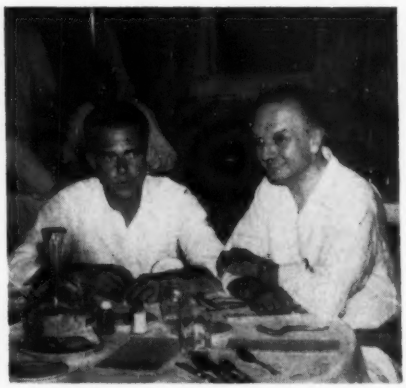
Among the featured speakers were, left to right: Paul A. Neal, U. S. Public Health; M. Goldberg, Geigy Inc.; S. A. Rohwer, USDA; S. R. Newell, USDA.



In the usual order, C. R. Cleveland, Standard Oil (Indiana); R. B. Stoddard, Dodge & Olcott; R. E. Ditsler, Westinghouse, and Harold Noble, S. B. Penick.

Speakers, A. E. Badertscher, McCormick & Co.; C. L. Weirich, C. B. Dolge Co.; R. C. Roark, USDA; G. Baird, Baird & McGuire; and J. L. Svirbely, U. S. Public Health Service, who highlighted developments in NAIDM's field.

H. W. Hamilton, Koppers, NAIDM secretary, and L. F. Livingston, du Pont. Mr. Livingston's topic was "Research Makes Jobs."



John Powell, John Powell & Co., and A. W. Morrison, Socony-Vacuum Oil Co. Both are NAIDM executive officers.

A. Cade, Givuadan-Delawanna, and E. G. Klarmann, Lehn & Fink, relax on the hotel porch between technical sessions.

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BETWEEN THE LINES

International Phosphate Trade

The Federal Trade Commission has just forwarded to the House and Senate a detailed report on international phosphate cartels which raises interesting speculation as to the future importance of these arrangements to American producers.

THE REPORT on international phosphate cartels just forwarded to the House and Senate by the Federal Trade Commission is largely compiled from the proceedings which in the past year resulted in disassociation of American phosphate producing organizations from international trade agreements which had existed for about two decades in the prewar period. The American interests involved apparently went into these arrangements only as a matter of self-protection, since they appeared to have been getting along well enough independently. However, the American shippers appear to have gained more from the arrangement, whatever the circumstances, than some of the European parties whose activities led the United States producers to join.

Contrary to the popular conception, the European producers definitely lost ground during the existence of the cartels, whatever may have been their undesirable features from a Washington standpoint. It is strongly indicated by the data, however, that powerful competition is still a potential factor in the postwar field, from both trans-Atlantic and trans-Pacific producers. On the other hand, the depleted state of world agriculture doubtless will result in a market for all for several years at least, measured only by the exchange available to buy phosphates.

American Associations Merge

The American associations, later merged, as shown in a preceding article, refer to the Phosphate Export Association, the Florida Pebble Phosphate Association, and the Florida Hard Rock Phosphate Export Association. The latter group for a short time had an agreement with the PEA for joint operations. This was later dissolved because of the diverse interests of the two groups.

The stated objectives of the PEA, the Federal Trade Commission recalls, were to engage on behalf of its members in export trade of phosphate rock, to obtain the largest possible share of the export market, at the best prices obtainable, and to stabilize prices, contract terms and conditions of sale.

Some foreign participation in these domestic associations is revealed by the report early in the history of their operations. Also some producers of foreign origin or affiliations, not members of these associations, are mentioned. Thus, according to the Commission, the only producer of Florida land pebble phosphate outside of PEA membership was Pembroke Chemical Company. This company is stated by the Commission to have been organized in 1933 to supply phosphate requirements of Albright and Wilson, an important British chemical concern which was stated to control the American company, and Ore & Chemical Corporation, which according to the Commission was German-controlled before the war.

Another later member of PEA was Coronet Phosphate Company, which at one time had a contract to supply Metallgesellschaft, a German industrial concern, with high grade phosphate. Later Coronet resigned from the association, and the Federal Trade Commission states that Metall, with its contract for supplies from this group, began about 1927 or 1928 an extensive sales campaign in Germany and other European markets in competition with PEA and producers in Morocco.

In December, 1933, the Commission reported, an agreement was reached following protracted negotiations between PEA, a French North African group representing private producers of Algeria and Tunisia, government-owned mines of Morocco, the Florida Hard Rock Association, and Egyptian interests.

This was referred to as "the French agreement" and is stated to have been the precept of others coming into existence about this time. These included, according to the Commission data, an agreement controlling the tonnage of Florida hard rock phosphate shipped to Europe; a Japanese agreement which controlled shipments of standard and low-grade phosphate shipped to Japan by PEA, the French North African group, and Egyptian mines; an agreement governing shipments from Curacao (Netherlands West Indies) to Europe; and several years afterward a further arrangement by which PEA and the French North African group sought to stabilize the Japanese market and to limit the shipments to Europe of high grade phosphate from Pacific islands.

As related in a previous issue, repeated efforts to bring into arrangements the large Soviet producing interests were unsuccessful. This summarizes the prewar international phosphate trade agreements, as reported to Congress by the Federal Trade Commission, and on the basis of which the Commission compelled American producer-associations to stipulate that thay would withdraw from existing arrangements of this nature, and to refrain from such agreements henceforward.

Effect on U. S. Producers

It is relevant to point out that American producers have always been heavy exporters, and it was thus inevitable that they would have encountered foreign cartels in their markets abroad in the past, and conceivably will do so in future. Digressing, it is interesting to note, in another Government report held secret during the war, but now revealed to a limited extent ("Concentration of Civilian Production by the War Production Board") that Leon Henderson, one of the earlier heads of that agency's predecessors, advocated what he called "compulsory cartelization" for war industry producers.

Thus the principle is admitted in some influential quarters at least, to have merit for special purposes. Certainly, as far as the European market is involved, the American producers benefited. During what may be called the pre-cartel period, the report shows, European consumption of Florida pebble phosphate increased from 10.67 per cent of the total during 1924-1928, to 12.94 per cent for the years 1929-1933, compared with 13.54 per cent for the cartel years 1934-1938. Florida hard rock shipments dropped during the pre-cartel era to 1.05 per cent of the European total consumption in 1929-1933 from the previous 2.26 per cent of 1924-1928, but ascended to 2.01 per cent under protection of the cartel arrangement.

An opposing argument is suggested here, though not in the report, as to whether the cartel agreements had the effect of bridling the evident increasing amounts of phosphate being absorbed by the European market from American shippers. If the agreements had not been existent, would the American trade have continued to rise anyway?

This line of conjecture is blocked by the fact that war started in 1939, and even if it had not the Russian competition was a new factor which would have necessarily had to be met, cartels or not. Shipments of Russian phosphate had jumped from a proportion of 1.59 per cent of European consumption in the years 1929-1933, to 9.59 per cent during the cartel years 1934-1938.

Actually, American shipments in-

Even a streamliner has to take a "Saturday Night" bath to keep sleek and shiny . . . and that's no small undertaking. It's usually accomplished by swabbing the stainless steel exterior with an acidic cleaning solution which is subsequently rinsed off with water.

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creased 30 per cent over the pre-cartel period in the cartel years. The French North African producers, whose competition originally led the American producers to enter into arrangements with them, were the actual losers, both to American and Russian shipments. French North African shipments to Europe showed a heavy decline during the cartel period, the Commission reveals, from a proportion of 80.37 per cent of total European consumption, pre-cartel, to 66.33 per cent during the cartel years. It is apparent, says the Commission, that the French mines absorbed both the cut from increased Russian tonnage and that of the American and other cartel members.

The major portion of the American increase was in Florida pebble phosphate, the average annual exports of Florida hard rock declining steadily despite a quota under the cartel arrangement. The "French agreement" appears to have not only benefited American sales abroad, but effectively cut off competition from French Africa on this side. Morocco was understood to have agreed not to ship to Cuba or Canada, and while that area shipped phosphate to the United States for several years up to 1932, no shipments were made from the French producers to the United States during the cartel existence. This suggests a question of the degree of balance between the advantages gained for American shippers in foreign markets and the consumer price situation with foreign production withheld, which the Commission report explores to some extent.

Prices Steady

The price structure for American exports in Europe was maintained during the life of the cartel, except for fluctuations when the various interests were attempting to meet the Russian situation. There was always a decided price advantage in favor of export sales over the domestic price, which was enhanced during the cartel years. However, the Commission recalled, the relatively low domestic price was attributable to a domestic price war, which, FTC indicates, was partly induced by the conditions inherent in the cartel.

Domestic shippers had export quotas. and if they increased production, it could only be at the expense of other producers. The inland situation of Tennessee producers prevented their entering the highly profitable export market.

American producers, it is interesting to note, resisted moves to increase European prices during the cartel period for the reason that such prices might bring in shipments from other foreign producers not at the moment competing because of ocean freight rates or other obstacles.

Freight rates were obviously a strong factor, the North African shippers having, just prior to the cartel agreements, displaced the United States as the principal suppliers of phosphates in the Japanese markets because of lower rates from Red Sea ports. Likewise, it is shown, Pacific island shipments, including Japanese mandate islands, enjoyed a freight advantage to Pacific markets.

American exports rose after World War I and up to World War II. The latter conflagration has disrupted the immediate pattern of the foreign market (Japan in the Pacific and Europe over the Atlantic) but the underlying field of demand is, of course, still there. Europe, before the war, consumed upwards of two-thirds of world production of phosphates. Japan was a heavy purchaser from several countries.

Leaving these facts from the report, and conjecturing, it is apparent that Russia is still the unknown potential in world markets, particularly if that government gains control of other producing areas in the Pacific or elsewhere; French North Africa and Egypt are still producers, as are the British islands of the Pacific mentioned in some detail in the preceding article. The American producers are still potent. That leaves a question as to the market. Europe is obviously a market, but with speculative buying resources; so is Japan. But in any event, American shippers are again, by government action, lone operators in the field, except as to their own organizations.

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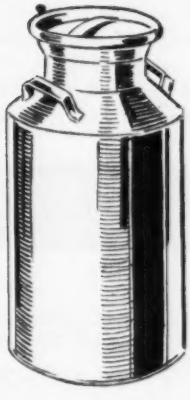

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NEW PRODUCTS & PROCESSES

Silica Replaces Carbon For Colored Rubber NP 335

Discovery of a sand product that gives rubber compounds the same qualities achieved through use of carbon black but without discoloration has been announced by the B. F. Goodrich Company.

The product is a powdery "fumed silica" produced by burning ethyl silicate. Under the electron microscope its particles have the same size and shape as the superfine ones of carbon black and perform exactly the same way in giving rubber compounds added tear resistance, abrasion resistance and tensile strength without affecting the rubber's color or translucency.

Dr. E. B. Newton of the B. F. Goodrich company laboratories is shown collecting, on a black plate, the new substance, described as "fumed silica," formed in its final stage by burning a colorless liquid, ethyl silicate, that is volatile enough to be used in a cigarette lighter, as Dr. Newton is doing.

Commercial utilization of the new compound is still many months away, because of its present high cost in relation to carbon black, according to B. F. Goodrich Chemical Company, Cleveland, the firm that will market the new material.

Need for a non-discoloring substance to fill carbon black's function in compounding has been intensified with the wartime switch to synthetic rubber. Plain natural rubber stocks can easily be made to show high tensile strength, while due to the inherent nature of some synthetic compounds they develop only low tensile. To increase this, carbon black has been used since 1911.

Use of carbon black has prevented the use of colors in many rubber products. Even tiny percentages of carbon black in a rubber compound make it impossible to achieve a clean white end-product. By using the new "white carbon black" necessary properties can be imparted to synthetic rubber compounds and any color desired be given to the product.

Diisopropylamine NP 336

Diisopropylamine is now available in experimental quantities, according to Commercial Solvents Corp. This amine boils at 83.7°C and for this reason can be used more conveniently and with less loss of material than is the case when lower secondary amines are employed. It has a freezing point of below —60°C, is partially miscible with water and completely miscible with most organic solvents. It undergoes the usual reactions of a secondary amine. Diisopropylamine should therefore be of interest as a starting material in the synthesis of a variety of products such as textile specialties, detergents, inhibitors, dyes and pharmaceuticals.

Permanent "Starch" For Textiles NP 337

Completely invisible on the fabric and unaffected by laundering and dry cleaning, a new textile treatment is said to give nurses' uniforms, women's summer dresses, sheets and shirts a permanent "starchiness" under all weather conditions. Bed spreads are said to retain their neat appearance longer when made from fabrics treated by this new process. Draperies have improved fold and hang. Curtains appear fresher and dresses retain their newness. The treatment, called Kandarizing, is non-toxic, non-irritating and will not tenderize the finest white broadcloth or most colorful chintz.

Concrete Coating NP 338

For the protection of concrete, masonry and metal structures from corrosion and deterioration, a new type of cold-applied coating, called Bituplastic, has been developed by the Wailes Dove-Hermiston Corporation. Rigid laboratory and field tests of the coating over a period of years show that it can be applied where damp surfaces formerly interfered with the effective application of regular protective coatings.

Bituplastic is a black, irreversible dispersion. When dry, it forms a tenacious, waterproof film which does not revert to its original state. The new material contains no volatile solvents, and is, moreover, actually a fire retardant, being practically incombustible. It is also virtually odorless and tasteless.

Of particular interest is the stability of the coating under heat. It will not flow or sag at any temperature up to 600°F, its disintegration point, nor does it alligator in direct sunlight.

Bituplastic is also especially effective as a "vapor seal" over various types of standard insulating materials.

New Mold Produces Penicillin-X NP 339

When medical research found that penicillin X is a super-penicillin—two or more times as potent on many organisms as commercial penicillin and capable of effective action against several organisms causing diseased conditions that do not yield to commercial penicillin—investigators sought new strains of the Penicillium molds that would be efficient in producing a better yield of penicillin X, thus making practical commercial production of this extra-effective form of the drug.

Kenneth B. Raper and Dorothy F.

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Please send me more information, if available, on the following items. I understand that nothing further may be available on some of them.

NP 335	NP 339	NP 343	NP 347	NP 351
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Alexander, of the U. S. Department of Agriculture, have reported that, after exposing to ultra-violet radiation a culture of one of the more promising strains, they had isolated a single new strain that gives a relatively high yield of penicillin with at least half of the penicillin in the desired X form. This is in contrast to yield of from one-seventh to one-fifth of penicillin X in the product of many of the strains previously tested.

The evidence is not conclusive that the variation or "mutation" in the fermenting capacity of the new strain is the result of the irradiation, but this is probable, the investigators report.

Medical research has shown that in some cases this X form of penicillin has shown strikingly superior results as compared with other drugs or with the commercial penicillin that was mainly penicillin G. It proved highly effective in treating a series of gonorrhea cases that did not yield to treatment with sulfa drugs; also in certain types of pneumonia and in streptococcus infections that resist other treatments—including commercial penicillin. Penicillin X had won in a case of bacterial endocarditis in which commercial penicillin had failed.

Another advantage of the X form of the drug is that it does not seem to be eliminated as rapidly as the other penicillins, and therefore, tends to check infections more effectively.

Penicillin X may be separated by a simple process from the mixed product recovered after fermentation. The other penicillins—F G and K—are soluble in chloroform. Penicillin X is not. This difference in the X form makes practical the isolation of the more effective drug.

The new mutant mold thrives in the same nutrient solution as the older strain of the molds. It grows well in the same nutrient—including corn steep liquor and lactose—which the Fermentation Division devised and which made possible economical commercial production of penicillin.

Cultures of the new mold are now available to commercial producers who wish to supply the more potent penicillin product to physicians and hospitals.

Fat Bleaching NP 340

Crude fats, normally used to make only the harsher laundry soaps, can now be employed to make high grade soaps and soap flakes as the result of a bleaching process developed by The Mathieson Alkali Works. The new process, which makes use of sodium chlorite, was developed as a result of the wartime shortage of fats and oils, and has been used successfully on a commercial scale for about a year.

With sodium chlorite bleaching, there is no chemical deterioration of the fat, and both color and odor are greatly improved. Moreover, the yield of tallow is considerably greater than when filtration and absorption methods of color removal are used. Only about two pounds of chlorite per ton of tallow are required. The bleaching process is made safe by means of careful chemical controls.

Refined tallow as well as crude grease may be bleached with sodium chlorite. The process consists of the use of chlorite in conjunction with either sulfuric acid or chlorine and may be carried out directly in the kettles used for fat purification. A batch of tallow may be bleached in about one and one-half hours.

Refined tallow, by this process, is improved in color from 13-15 to 3-5 F.A.C., with no reversion. Brown grease and house grease are improved from about 41 to 13-15 F.A.C.

Blue-print Improvement NP 341

Greatly improved reproduction of blue printing and related processes is made available by a new treatment worked out by H. P. Andrews Paper Company, with assistance of Monsanto Chemical Company's Merrimac Division.

The new treatment provides greater sharpness in lines, more fidelity in details, and a brighter color in blue prints and photo reproductions. It is based on Syton, a colloidal silica, originally developed for use in treating textiles. Syton is applied as a water solution to the base paper before coating with light sensitive materials. The paper may be pre-treated by blue print paper coaters, although mill application at point of manufacture may be ultimately utilized.

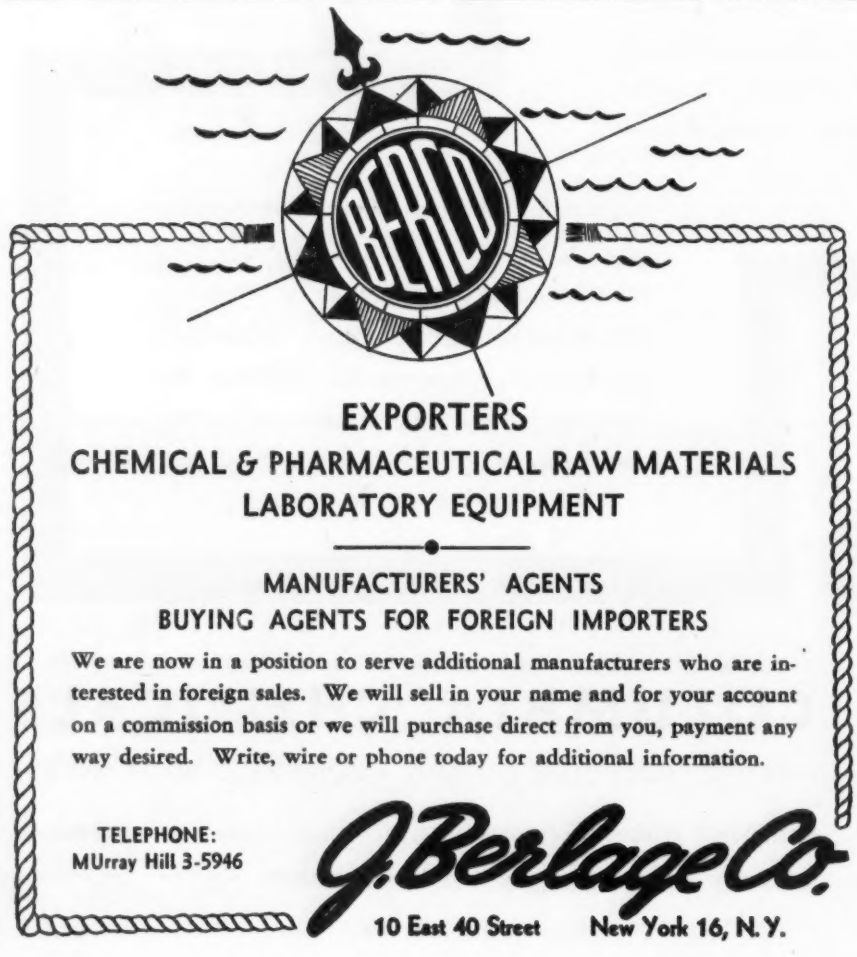
Although the new treatment is most evident on drawings utilizing fine lines and details, it provides an improvement on virtually all types of reproduced drawings. The greater sharpness and fidelity is especially noticeable on reproductions of tracings made wholly or in part with pencil.

Nylon Sheets NP 342

The Du Pont Company is manufacturing experimental lots of a solid nylon sheeting which, because of its toughness, is expected to provide outstanding durability in leather-like applications.

This experimental development has reached the point where it is believed it will eventually open an entirely new field for nylon. The material was shown to the public for the first time at the National Plastics Exposition starting Monday, April 22, at Grand Central Palace, New York City. It will not be available until some production problems are solved and manufacturing facilities constructed.

Nylon is made into sheeting by being forced out through a slot on a special machine, in one continuous strip of any thickness desired. It can be made in various colors, and can be run through em-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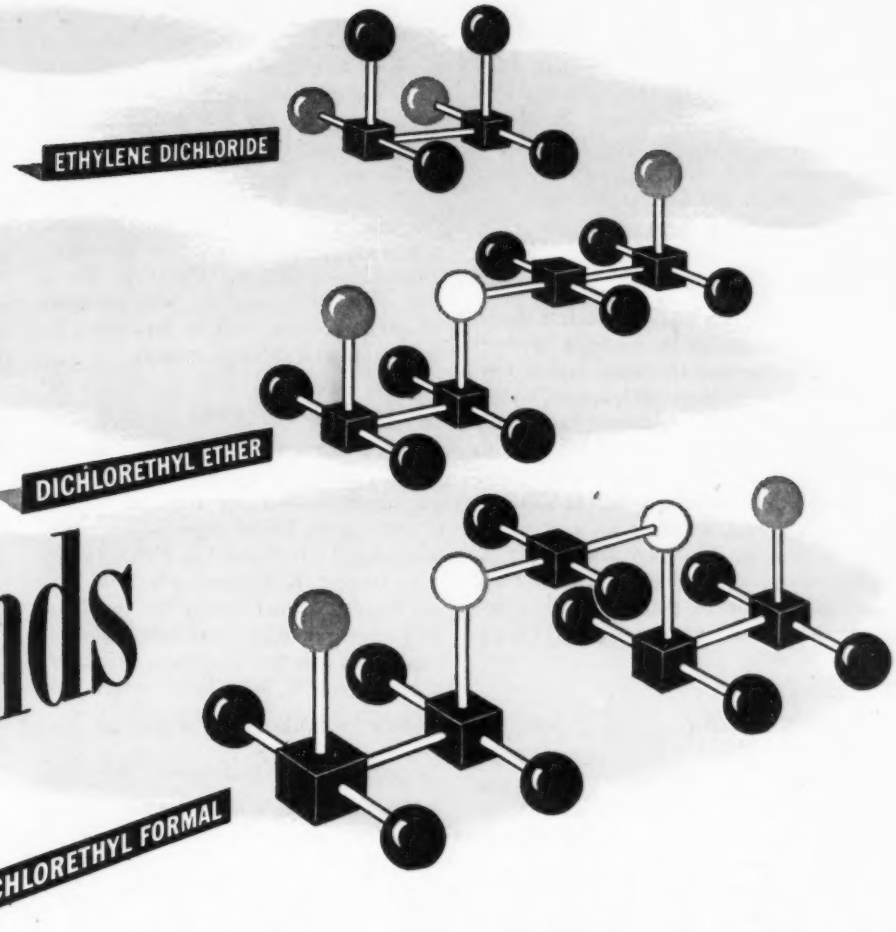

chlorine compounds

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The molecules represented here are some of the chlorinated organic compounds that have been developed by Carbide and Carbon Chemicals Corporation to meet the needs of industry and agriculture.

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Chlorine compounds are useful as general industrial fumigants and as agricultural soil fumigants for the control of insect pests.

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bossing rolls to give it any grain or other finish.

The plastic is expected to find general use for such purposes as wallets, brief cases, handbags, and other articles now customarily made of leather. It is also expected to prove of special value for seat covers and panelling on trains, buses and airplanes and for various decorative uses in the home.

Fabric Treatment NP 343

B. F. Goodrich and Treesdale Laboratories of Pittsburgh are readying "Permaproof," a chemical treatment said to render any sort of fabric mildewproof, waterproof and flameproof without having any tendering effect on the base fabric, with a minimum of added weight, and no disturbing effect up fancy colors or patterns. Applied by dip, spray or paint, it works outdoors or in. Tents, awnings, draperies, slip covers, auto upholstery, even rugs, are included in its potential field of application.

Aluminum Brazing Flux NP 344

A new, superior flux for efficient brazing of aluminum with X716 wire has just been introduced by A. K. Mauk. Designated as "Flo-Well" No. 2, it is equally useful in either furnace brazing or torch brazing aluminum. It can be applied easily by inexperienced workmen and will not solidify or deteriorate.

"Flo-Well" and X716 may be employed alone in brazing 61S and, in combination with hydrogen and oxygen, may be used in brazing 2S, 3S, 24S and 52S. The X716 wire can be obtained wherever aluminum is sold, or direct from A. K. Mauk.

The new flux is packaged in ½ lb. and 1 lb. glass jars for protection from moisture, and is also available in larger quantities. Free samples of both "Flo-Well" No. 2 and wire X716, together with complete directions for use, will be forwarded by the manufacturer upon request.

Cationic Detergent NP 345

A new felt washing compound known as Syntergent K is proving a boon to the paper making industry by helping to prolong the life of papermakers' felts, according to National Oil Products Co.

Syntergent K is extremely mild and has no detrimental effects on the felts, yet keeps the felts clean and makes it possible to operate at greater efficiency.

Syntergent K is a light, amber colored liquid, and is cation-active.

Agent for Wool NP 346

Maxitol #10 is a new protective agent and dyeing oil for wool recently developed by the Textile Chemical Division of the Dexter Chemical Corp. This highly sulfated oil not only promotes level dyeing of wool and assists in penetration, but also protects the fibre in dyeing, bleaching, drying, and after use. It tends to facilitate the production of highest quality goods.

Because of its peculiar chemical character, Maxitol #10 differs from ordinary sulfated products in being able to form a stable compound with the basic groups of wool. The fibres are therefore covered with a thin film of oil which cannot be rinsed off due to the fact that it is bound chemically to the wool substance.

Microcrystalline Wax From Waste Oil NP 347

Oil containing as high as 17 per cent microcrystalline wax, or paraffin of a high melting point, has been salvaged from weathered tank bottom settlings—commonly considered waste material in the oil industry—under processes developed in Bureau of Mines laboratories and used successfully in a field pilot plant near El Dorado, Kans.

Development of the relatively simple Bureau process embodying four main principles for the recovery of a clean wax-bearing oil is described in a new Bureau publication now available for free distribution.

The Bureau process for salvaging the

For over a quarter of a century Franks Stearates have been noted for their high quality. Now that the Franks Chemical Products Company has become a division of Witco Chemical Company, industry is assured that this reputation of quality, already established, will be zealously guarded.

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paraffin from tank bottom emulsions depends upon proper destabilization, very intimate mixing of the emulsion and the demulsifying chemical, heating to a higher temperature than usually employed, and rapid settling of the salt water and foreign material.

Two methods for separating the clean oil are being tested; one by recovering the wax-bearing oil in a hot tank by gravitational separation and the other by mechanical filtration, Results of the first test show that more than 90 per cent of the wax-bearing oil in the waste emulsion is recoverable, but additional research is needed to determine the economics of the mechanical filtration method to eliminate dirt and water.

A copy of the publication, Report of Investigations 3869, "Recovery and Utilization of Oil From Oil-Field Waste Emulsion," may be obtained by writing to the Bureau of Mines, Department of the Interior, Washington 25, D. C.

Cutting Oil Bases NP 348

Three new cutting oil bases for use in the metal-working trades, including a unique, extreme-pressure cutting oil base known as Nopco 1009-C, have been developed in the research laboratories of the National Oil Products Co.

Recommended for steel, brass and copper cutting operations in which frictional loads are extremely high, Nopco 1009-C is a specially prepared fatty oil base containing a high content of equal parts of sulphur and chlorine. Absolutely odorless and free from tarry matter, it blends in all proportions with any diluent petroleum oil, down to required viscosity, sulphur and chlorine specifications. Blends of this base are non-rusting and non-corrosive on ferrous metals.

A powerful, sulphurized cutting oil base, known as Nopco 1009-A, and a soluble cutting oil base, described as Nopco 2009-A, also have been developed. The former contains 15 per cent sulphur in both chemical combination and active form, and is recommended for straight cutting operations on ferrous metal.

One of the outstanding qualities of Nopco 2009-A, the soluble cutting oil base, is the great stability or permanency of the emulsion formed by diluting the mineral oil base blends with water. The mixture possess strong detergent properties, and at the same time liberates no free alkali or chemicals injurious to plant operations.

Aromatic Chemicals

IN INDUSTRY

THE field of Aromatic Chemicals in Industry has widened considerably in recent years.

NO longer is the use of Aromatic Chemicals restricted to the Soap, Cosmetic and Perfume Manufacturer.

AS industrial deodorants, aromatic chemicals are widely used in the production of rubber, paper, textile, paints and in many household, agricultural and industrial specialties.

FURTHER research is constantly being made by us to improve and widen our lines of Aromatic Chemicals.

PERHAPS we can be of service to you.

Among our many products the following are proving useful in numerous industries:

Butyl Phenyl Acetate	**Cinnamic Alcohol**
Lignin Vanillin	**Ionone Ketone**
Veratraldehyde	**Ionone Methyl**
Ethaldehyde	**Acetophenone**

Linalool Extra

Phenyl Acet Aldehyde Di Methyl Acetal
Di Phenyl Acetal of Phenyl Acet Aldehyde
Hydratropic Aldehyde
Para Methyl Hydratropic Aldehyde

To deodorize Paints for Interior Finishes
DEODORANT BOUQUET 4068

Write us for Information

Aromatics Division
GENERAL DRUG COMPANY
125 BARCLAY STREET NEW YORK 7, N. Y.
9 S. Clinton Street, Chicago 6 1019 Elliott Street, W., Windsor, Ont.

Nucleates NP 349

Three metallic nucleates, magnesium nucleate, manganese nucleate, and silver nucleate, have now been added to Schwarz Laboratories' list of fine chemicals. All of these salts are water soluble and are of high quality.

The company offers to send technical data concerning these Schwarz products or further information about its other nucleic acid salts or nucleic acid derivatives.

Insulating Varnish NP 350

A new internal-curing insulating varnish which is claimed to cut curing time up to 50%, yet which involves no change in curing equipment, has been announced by Irvington Varnish and Insulator Co. Known as Harvel 912C, it is a new member of the Harvel series of phenol-aldehyde varnishes produced by Irvington. Typical operational curing schedule of 912C in standard convection ovens, based on actual coil curing, is:

2 to 4 hours at 285 deg. F.
3 to 5 hours at 260 deg. F.
4 to 6 hours at 250 deg. F.

These schedules vary slightly with coil size and iron mass; and the periods can be reduced with the use of infra-red equipment.

In addition to faster curing schedules, 912C also provides greater dip-tank and storage stability, while maintaining all the favorable electrical and chemical properties of Harvel varnishes. Information and samples can be secured from the manufacturer.

Mercerizing Assistant NP 351

Development of Dypenol SED, a new member of the Dypenol series of mercerizing assistants, has been announced by the Textile Chemical Division of the

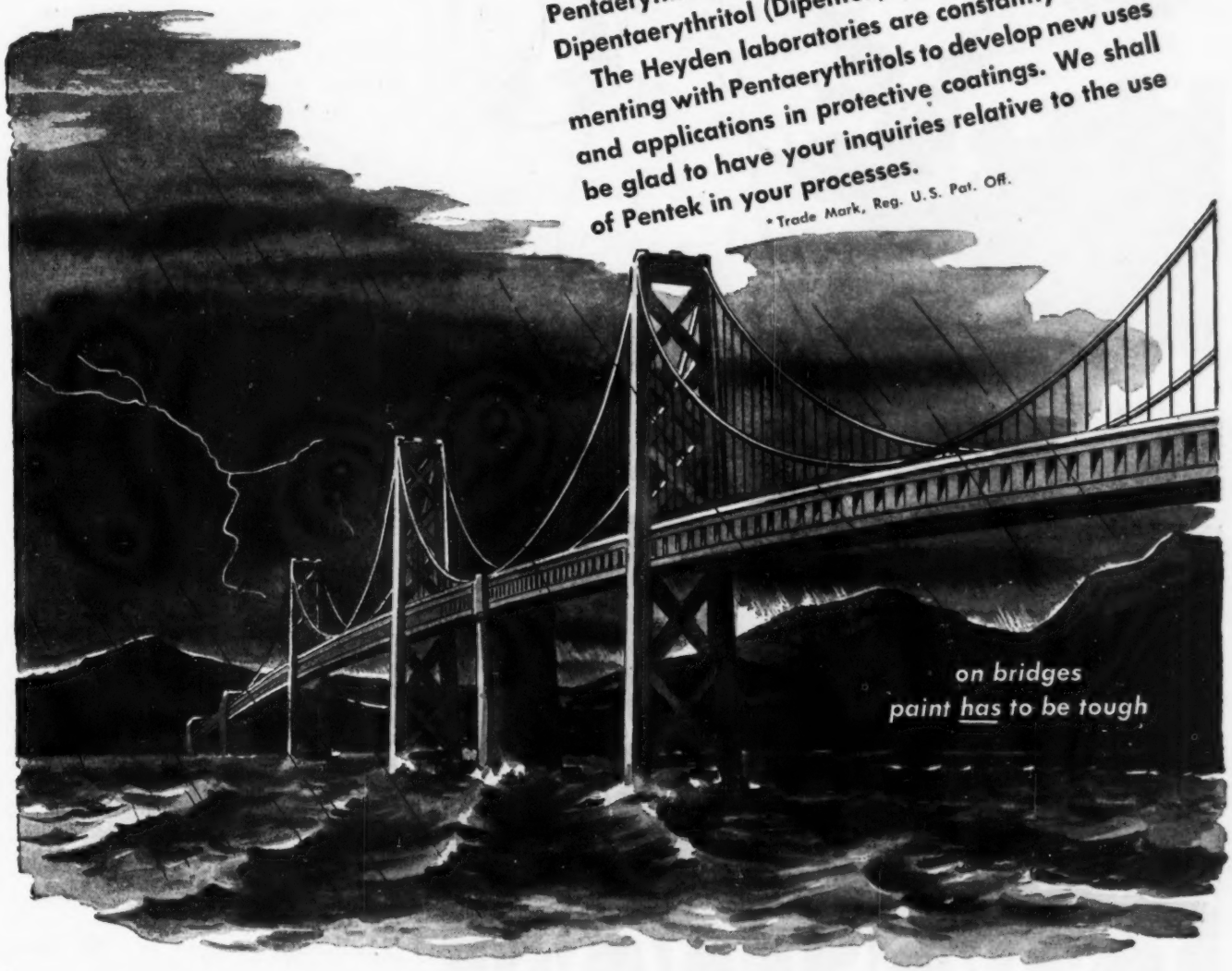
PENTEK* FOR IMPROVED PAINTS and VARNISHES

Paint and varnish coatings formulated with Pentek —a technical grade of Pentaerythritol—are faster drying, quicker bodying, more glossy, more durable and have greater resistance to moisture and alkalis.

Pentek consists of approximately 85% mono Pentaerythritol and 15% higher polymers such as Dipentaerythritol (Dipentek).

The Heyden laboratories are constantly experimenting with Pentaerythritols to develop new uses and applications in protective coatings. We shall be glad to have your inquiries relative to the use of Pentek in your processes.

*Trade Mark, Reg. U.S. Pat. Off.



FINE HEYDEN CHEMICALS

HEYDEN *Chemical Corporation*

393 SEVENTH AVENUE, NEW YORK 1, N. Y.

Chicago Sales Office: 180 N. Wacker Drive, Chicago 6, Ill.

Benzaldehyde • Benzoates • Benzoic Acid • Benzyl Chloride • Bromides • Chlorinated Aromatics • Medicinal Creosotes • Formates • Formaldehyde • Formic Acid Glycerophosphates • Medicinal Guaiacols • Hexamethylenetetramine • Paraformaldehyde • Parahydroxybenzoates • Penicillin • Pentaerythritols • Salicylates

CHICAGO COLISEUM
NATIONAL CHEMICAL EXPOSITION
SEPT. 10, 11, 12, 13, 14
☆ 1946 ☆

Dexter Chemical Corporation. By adding Dypenol SED directly to the mercerizing caustic, preliminary boiling-out of the yarn or fabric may be eliminated. The use of this assistant permits higher mercerizing speeds without decrease in degree of mercerization. It has a high degree of wetting speed and does not lose its power through exhaustion onto the goods nor on standing in the caustic. Recommended for use in caustic soda solutions ranging in strength from 48° Tw to 58° Tw, it also prevents foaming in the recovery of the caustic.

Dyeing Assistant NP 352

A combination detergent, levelling agent, and protective agent has been developed by the Textile Chemical Division of the Dexter Chemical Corporation for use in the dyeing of wool, wool unions of cotton and rayon, and loose fur. Introduced as Telkanol O Solution, this product can be applied advantageously for a multitude of purposes in dyeing.

Distinguished by stability towards all kinds of chemicals occurring in the processing of wool, including boiling acid liquors, it is unaffected by the hardness of water, acids, alkalis, or salts and may be used for machine dyeing.

It has a strong dispercing effect upon oil, grease, or other impurities retaining within the goods and upon all kinds of fats in the acid liquors.

It is very successfully used for the dissolving and dyeing of dyestuffs which, because of limited solubility, give trouble in levelling and is recommended in acid dyebaths, afterchroming or monochrome dyestuffs.

Glyoxal NP 353

Glyoxal is available from Carbide & Carbon Chemicals Corp., both as a 30 per cent aqueous solution and as the crystalline bisulfite addition product.

Having two functional groups, glyoxal is an interesting reagent for a variety of organic reactions. It forms acetals, condenses with hydroxyl or amino groups, and forms the usual addition compounds with HCN, NH_3, N_2H_4 and amines.

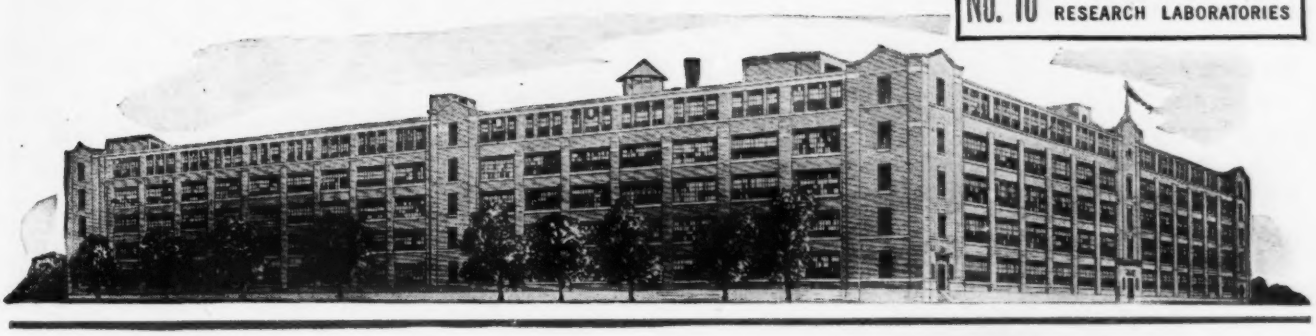
Its chief commercial application at present is in a rayon stabilizing process developed by Cluett, Peabody & Co., Inc.

Aluminum Foil Laminant NP 354

A laboratory report from Paisley Products, Inc., describes the properties and suggested uses of a new synthetic thermoplastic resin emulsion adhesive designed for foil lamination.

Recommended primarily for roll applicator machines, the new adhesive will handle all grades of aluminum foil to cellophane, acetate, glassine, bond, kraft, sulphite, chip-board and other materials, according to the manufacturer.

No. 10 OF A SERIES FROM CYANAMID RESEARCH LABORATORIES



Overcome the effects of metallic contamination . . .

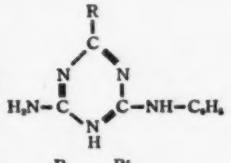
AERO* PHENYL BIGUANIDE HYDROCHLORIDE

Phenyl biguanide is a strong base which can be readily prepared from the more easily handled hydrochloride. This compound overcomes the effects of metallic contamination resulting from processing operations, handling or storage. A complex is formed between the aryl biguanide and the metallic impurity in many instances effectively neutralizing the metal's catalytic activity. Thus phenyl biguanide can be considered as a metal deactivator or indirectly as an antioxidant.

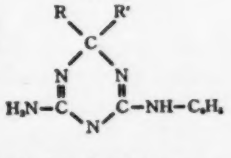
USE AS AN INTERMEDIATE

Phenyl biguanide can be used as an intermediate in the preparation of heterocyclic organic nitrogen compounds—mainly six membered rings containing two or three nitrogen atoms. For example, it reacts with:

Formamide, esters, and acid chlorides yielding substituted 4-N-phenyl guanamines



Aldehydes and ketones yielding diaminodihydro triazines



Phenyl biguanide hydrochloride is currently available in research quantities from our pilot plant. If your investigations indicate the use of one of the other aryl biguanides, we will be pleased to discuss with you the availability of ortho-tolyl and para-nitro-phenyl biguanide.

PROPERTIES

Pure phenyl biguanide hydrochloride	
Form	White powder
Melting Point	237°C.
Molecular Weight	213.5
Solubility	Insoluble in cold water
	Moderately soluble in hot water

*Reg. U. S. Pat. Off.

AMERICAN Cyanamid AND CHEMICAL CORPORATION

A Unit of American Cyanamid Company

FREE SAMPLES AND TECHNICAL DATA

American Cyanamid & Chemical Corporation
Section ON, Synthetic Organic Chemicals Dept.
30 Rockefeller Plaza, New York 20, N. Y.

Gentlemen:

☐ *Rush my sample of Phenyl Biguanide Hydrochloride*

☐ *Rush my copy of technical data sheet*

*Name*_____

*Position*_____

*Company*_____

*Address*_____

HEADQUARTERS FOR NITROGEN CHEMICALS

NEW EQUIPMENT

O_2 Breathing Apparatus QC 865

Mine Safety Appliances Co. has announced the new M. S. A. Chemox oxygen breathing apparatus. This apparatus,

employing a replaceable chemical canister, generates its own oxygen and gives the wearer one hour's protection in unbreathable air.

For the first time this chemical combination in a simple canister creates oxygen—by merely breathing into it. Exhaled breath passes from the "All-Vision" facepiece through the exhalation tube and into the canister where carbon dioxide is removed. Evolved oxygen flows into the breathing bag reservoir, then to the facepiece through the inhalation tube.

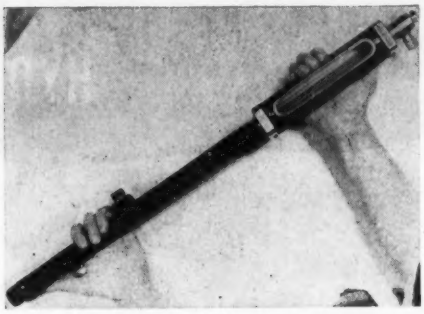
The M. S. A. Chemox self-generating oxygen breathing apparatus is simple to use, and can be worn and operated without special training. It is quickly put on, and the replaceable canister does the whole job. Before the canister is exhausted, a pre-set alarm bell rings a warning to replace the canister with a fresh one.

Molded Porcelain Insulating Beads QC 866

New molded porcelain insulating beads have been announced by the Harold E. Trent Co. They are designed to form a continuous flexible line for insulating all types of wire. The sizes available range from 0.056″ ID and 0.125″ long to 15/16″ ID to 1.5″ long.

Rotameter QC 867

Fischer and Porter Co. have announced the new Rota-Tronic instrument for



measuring flow rates as small as 5 mls. of liquid or 20 mls. of gas per minute, and which is capable of a full-scale traverse in three seconds.

Instead of using a direct-acting impedance bridge circuit as in the larger rotameters, the transmitter coils and actuating armature are of very fine wire. A similar set of impedance coils and armature are located in the remote indicating instrument. Here the resemblance to a direct-acting bridge circuit ceases, as movement in the remote instrument is not caused by direct solenoid pull. The function of the bridge circuit is that of passing a minute electric current across the center leg when the transmitter armature and the receiver armature are not in corresponding position in their respective coils. This current is used to operate an electronic power relay for operation of a two-phase serve motor to position the receiver armature.

Pump Booster QC 868

Using standard fire pumping equipment or its equivalent, the Accel-O-Rate pump booster of the Derbyshire Machine and Tool Co. will lift water vertically 100 feet or more, and will draft water for distances of 200 to 300 feet from water sources impossible to reach because of gulleys, ditches, mud or other obstacles.

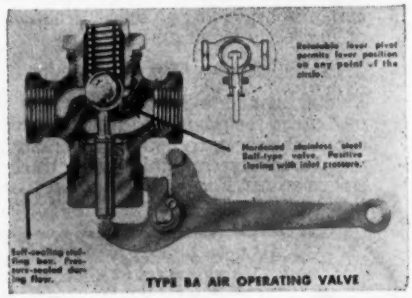
Employing the jet pump principle, this unit has no moving parts, weighs but 18 pounds, and will not become clogged.

Installation and use are simple: Two 2½″ soft hose lines are run from the pumper to the Accel-O-Rate which is submerged in the water supply. When the pumper takes suction after priming, the driving water going through the jet entrains additional water which is returned to the suction side of the pumper. This additional water is available for fire fighting. The size illustrated will supply adequately a ½″ tip.

Air Operating Valve QC 869

A new self-sealing, air operating, ball type valve has been announced by Leslie Co.

Fitted with a hand opening lever and a rotatable pivot so that the lever can be located in any position, this new valve



can be opened instantly from almost any position with either a horizontal or vertical pull. The ball valve closes tight with inlet pressure and will not collect dirt or other foreign matter.

The stuffing box is not accessible to tampering or adjustment and is self-packed by the operating pressure when the valve is open, permitting flow. Operating pressures up to 200 psi are recommended, and it is constructed with cast iron bodies, integral seating surfaces, screwed connections, and in ½″ size.

Electric Hoist QC 870

Lisbon Hoist & Crane Co. announces the introduction of their Bob Cat Model of electric hoists. It is one of the small-

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (7-6)

Please send me more detailed information on the following new equipment:

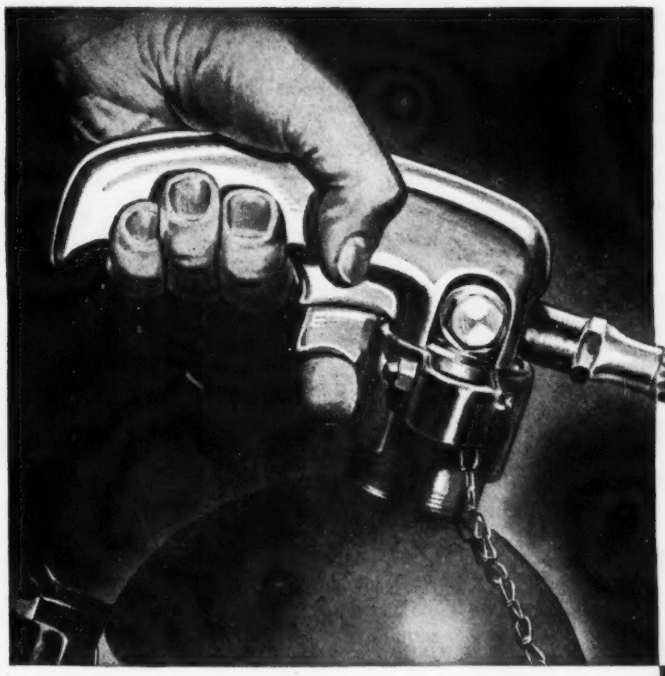
QC 865	QC 871	QC 878	QC 885	QC 892	QC 899
QC 866	QC 872	QC 879	QC 886	QC 893	QC 900
QC 867	QC 873	QC 880	QC 887	QC 894	QC 901
QC 868	QC 874	QC 881	QC 888	QC 895	QC 902
QC 869	QC 875	QC 882	QC 889	QC 896	QC 903
QC 870	QC 876	QC 883	QC 890	QC 897	QC 904
	QC 877	QC 884	QC 891	QC 898	QC 905

Name .....

Company .....

Street .....

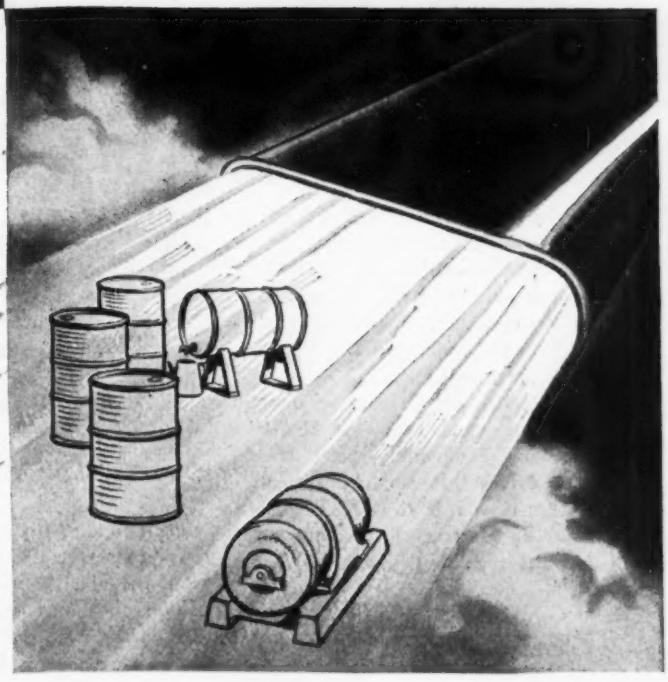
City & State .....



PULL THE TRIGGER...

KILL THE FIRE

- ***In Flammable Liquids***
- ***In Electrical Equipment***



All Kidde Hand Portable Extinguishers work the same simple, natural way: *Aim the nozzle. Pull the trigger. Kill the fire.*

IT'S JUST AS EASY AS THAT!

Kidde Portables are safe to use, sure in action against incipient fires in flammable liquids or electrical equipment. With carbon dioxide capacities from 2 to 20 pounds, they pack the punch that knocks out small lab blazes or relatively severe industrial fires.

The dry inert carbon dioxide discharged by Kidde Portables cannot damage equipment, nor contaminate liquids. No after-fire mess or moisture.

Your *larger* hazards may call for Kidde Wheeled Units or Systems. But at the smaller danger spots—keep a Kidde Portable within easy reach!

Ask a Kidde representative for details. Better still, place your order *now.*

Walter Kidde & Company, Inc. • 727 Main Street, Belleville 9, New Jersey

Kidde

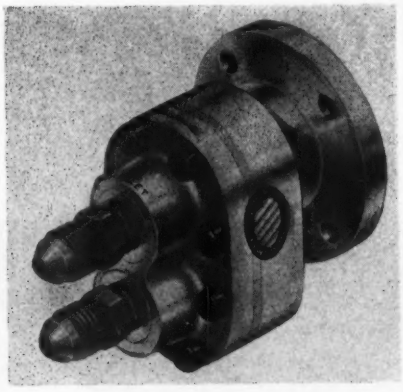
The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Kidde

est in overall dimensions of any standard hoist and is made in three sections, permitting complete and easy access to any part by the removal of about four bolts. It has a safety factor, so it is claimed, of at least six to one. The motor is enclosed in the drum, with patented heat dissipation construction and connection. Ball bearings are used throughout.

Lubrication Pump QC 871

The Series 1200 pump of the McIntyre Co. is designed for pressure lubrication and fluid handling in aircraft at high altitudes. This direct-drive gear pump is



a small light weight (8 oz.) unit operating with a volumetric efficiency of 95%. Three standard models displace from .08 gallons per minute to 1.5 gallons per minute at speeds ranging from 1140 R. P. M. to 3450 R. P. M. against pressures up to 150 pounds per square inch.

Standard models are designed for direct motor application, but pumps can be furnished for flange mounting, belt, spline and other drives. Power requirements vary between 1/100 H. P. to 1/8 H. P. The pump body is constructed of aluminum, with nitrided nitralloy spur gears and shafts.

Neoprene Coverall QC 872

A new buff-colored neoprene coated coverall has been designed by Benson and Associates. The coverall completely protects the worker from neck to shoetops. Protected zipper closures at front, wrists, and ankles insure a closed, protecting garment, which effectively repels splashes at all points. A hood, snapped on at the back of the collar, protects the entire head from splashes and spray. Goggles or face masks can be comfortably worn when the hood is in place. The coverall is light in weight—less than 3 pounds.

Hydro-Steam Vacuum Unit QC 873

The newly developed hydro-steam vacuum unit available in 1, 2 or 3 stages of steam jet boosters has been announced by Schutte & Koerting Company.

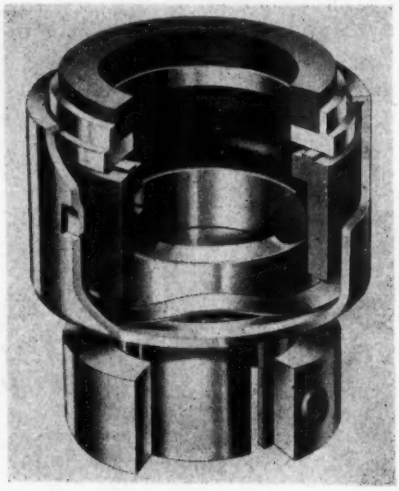
The units are available in six sizes with a water jet vacuum pump and 1, 2 or 3 stages of steam jet boosters. No barometric leg is required and the necessary auxiliary equipment may be included.

The steam jet exhausters operate in series discharging into a water jet exhauster which serves both as a condenser for the actuating steam, and as the low vacuum stage jet. Only a small amount of make-up water is required as that which discharges from the water jet exhauster is stored for reuse before recirculation by means of a small centrifugal pump. The horsepower of the six units available ranges from 1.5 to 7.5.

Mechanical Seal QC 874

A new seal, Sealol CB, for rotating shafts has just been announced by Sealol Corp. This new seal is designed for original equipment or replacement of stuffing boxes.

The "Sealol CB" is packaged as a



complete seal, without any loose parts. No skill or special tools are required to install the unit . . . it slides easily into position on the shaft and is locked in place with two setscrews. The only relative movement is at lapped faces and reasonable shaft run-out does not affect the performance of the seal. It is available in non-corrosive construction for shaft sizes ½" to 1", other sizes to order.

Rotameter Light QC 875

A new lighting device for the SK Universal Rotameter has just been introduced by the Schutte & Koerting Co. Since many Rotameters are installed in poorly-lighted locations, its use assures easy, accurate readings. The device, a baked-enamel metal hood with narrow frontal opening, fits snugly against the back of the rotameter tube and directs a beam of light through the glass toward the operator. Thus rotor and meter scale are clearly outlined even when the metered fluid is semi-opaque in character.

The lighting unit can be easily attached to any SK 250 mm length Universal Rotameter by means of a bracket furnished with each device. Push-button socket, 10 foot rubber-covered attachment cord and plug are included. It uses a 110 volt tubular incandescent lamp.

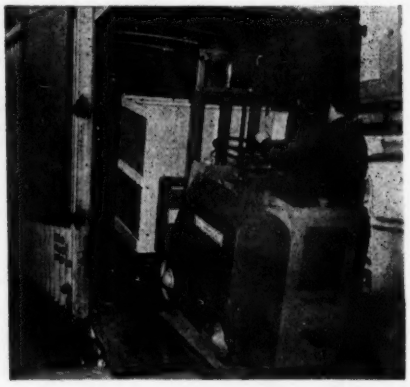
Conveyor QC 876

Speedways Conveyors, Inc., announce the new Speedlift belt conveyor, which is easily adjustable; reversible; and, likewise, portable. It can serve as an individual booster in a conveyor line and is also ideal for stacking cases, boxes, cartons, etc. Speedlift can also be used as a connecting link in a system of horizontal belt conveyors or as a feeder conveyor. The small truck (only 22" x 62") permits use in confined areas.

Speedlift is adjustable from the horizontal up to 35° when its elevation at one end is 12" and 102" at the other, 6" rubber tire casters provide ease of handling. At 35° it moves a distributed load of 150 lbs 50 ft. per min.—250 lbs in the horizontal. A hydraulic jack is used to adjust the height.

Lift Truck QC 877

A new addition to the "one-man-gang" lift trucks made by Towmotor Corp. is the compact Model LT-35 with a side-

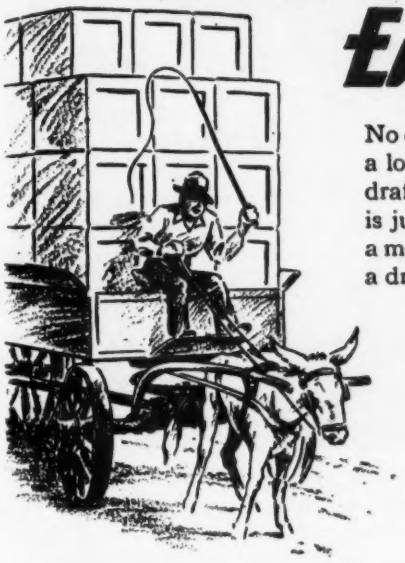


mounted motor engineered to cut wheelbase length to 35 inches. Placement of the motor on the side reduces over-all length without sacrifice of strength. Lifting and tilting mechanisms are hydraulic, as on other Towmotor models.

The model LT-35 weighs only 2800 pounds but will lift, carry and stack a 1500 or a 2000 pound load in areas previously inaccessible to lift truck operation. Its comparatively light weight also makes operation possible on 2-ton capacity elevators and in multi-story buildings with low to medium load limits.

The unique design of the new model places the operator at the side of the power unit and makes it easy for him to get on and off. The seat has a comfortable back rest and is fully protected front and rear; while entrance to the driver's compartment is wide with the step only 9½" high. Two wheels on the steering axle achieve a short turning radius without sacrifice of safety or stability.

To get *more* for your valve dollar *consult* POWELL *Engineering*



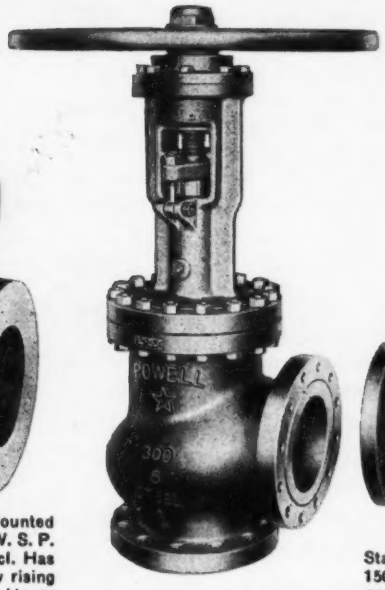
No one would expect a burro to pull a load that requires a heavyweight draft horse. But a sure-footed burro is just right for carrying a pack on a mountain trail where the power of a draft horse would be wasted.

And yet when it comes to valves, such "misapplication" is often encountered. *Many cases of failure are directly due to expecting service from a valve which it was not designed to give.* Consequent replacements are costly. On the other hand, it is not sound economy to use a valve of more expensive construction than the particular service requires. The Powell Line* of Bronze, Iron, Cast Steel and Corrosion Resistant Valves, is so *complete* that there's a POWELL Valve that's *just right* for every flow control condition encountered in modern industry. When you need valves for new installations or for replacements, don't risk "misapplication". Consult POWELL Engineering and *get more for your valve dollar.*

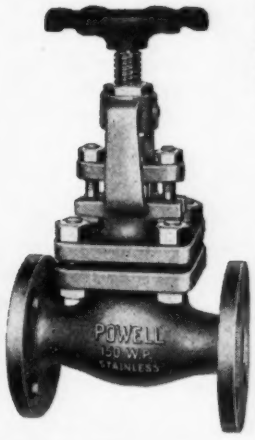
The Wm. Powell Company, Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

Large Iron Body Bronze Mounted Gate Valve for 125 pounds W. S. P. Made in sizes 2" to 30", incl. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc. Taper wedge double discs can be provided in sizes 2" to 12", incl. Seat rings and stem are bronze. Disc is bronze in 3½" and smaller size valves and bronze faced in the larger sizes. Also available in All Iron for certain services.

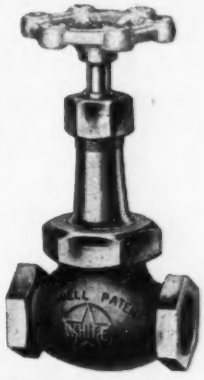


Class 300-pound Cast Steel Angle Valve. Has flanged ends, outside screw rising stem and bolted flanged yoke. Streamlined areas through the body assure maximum flow with minimum pressure drop..

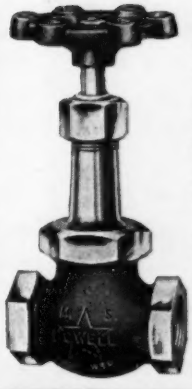


Stainless Steel Gate Valve for 150 pounds W. P. Has flanged ends, outside screw rising stem, bolted flanged yoke-bonnet and taper wedge solid disc. This is one of many special Powell designs for handling corrosive media. Available in a wide range of corrosion resistant materials.

*In writing for catalogs kindly specify the service conditions under which the valves, in which you are interested, must operate.



Small Bronze Globe Valve for 200 pounds W. S. P. Made in sizes ¼" to 3", inclusive. Has screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable wear-resisting "Powellium" nickel-bronze disc. A long-life valve for severe service conditions.



Small Bronze Globe Valve for 200 pounds W. S. P. Made in sizes ¼" to 3", inclusive. Has screwed ends, union bonnet and renewable, regrindable hard bronze disc. An economical valve for intermediate steam, oil, water or gas lines.

POWELL VALVES

Wire Cloth QC 878

The Newark Wire Cloth Co. has announced the availability of 400 mesh wire cloth woven with monel wire 1/1000 of an inch in diameter to form openings one and one-half thousandths of an inch square.

Preforming Press QC 879

The production time required for hundreds of heavy duty plastics products will be markedly reduced by use of a new semi-automatic preforming press developed by General Electric Co.

The development will permit high bulk phenolic materials, previously preformed by hand, to be preformed into units weighing as much as one pound.

The new press allows material to be dielectrically pre-heated, a treatment that cannot satisfactorily be applied to nonformed compound, and is slated to reduce the molding cycle considerably; in some instances, as much as 50%.

G-E engineers stated that the new process will be applied principally to electrical and mechanical parts which require high bulk phenolic materials.

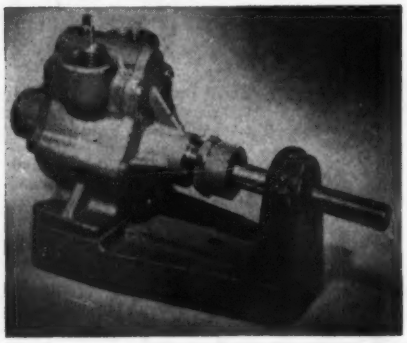
Aprons QC 880

Pulmotek aprons and sleeves of the Pulmosan Safety Equipment Corp. are now being manufactured by a new method of electronic welding to provide leakproof permanent seams.

Double Impeller Gearless Pump QC 881

A new double-impeller gearless pump, with standard 1" connections and a built-in external driveshaft bearing and base, has been developed by Eco Engineering Co.

The Eco pump employs double impel-



lers made of several layers of a pressure-vulcanized, laminated material, and can pump equally well in either direction. These impellers pass sand, grit, filings, or sludge without stalling, jamming, or stripping and without damage to the bronze pump body, and are easily replaced when the six-screw face-plate is removed.

The built-in driveshaft bearing and base eliminates side-pull when the pump is powered by a belt-drive and pulley, and rules out the necessity of constructing and installing an improvised bearing. In addition, it furnishes a solid base on which to mount the pump.

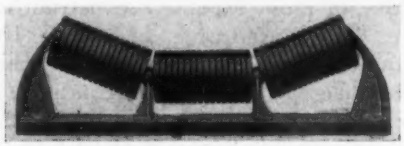
Eco gearless pumps can be mounted at any angle, and will pump in either direction. No adjustments or lubrication are needed, except on the external driveshaft bearing.

The overall dimensions of the new double impeller model, with standard one-inch connections and built-in driveshaft bearing and base are 10½" x 4¼" x 5¾". Its capacity varies from 7.5 gallons per minute at 600 R. P. M. to 23 gallons per minute at 1800 R. P. M.

Belt Conveyor Troughing Idler QC 882

A newly designed impact cushioning troughing idler, the Rex Style No. 35, for belt conveyors is now being manufactured by Chain Belt Co.

Each roll consists of a rubber cylinder



vulcanized to the assembly tube. The cylinder has multiple grooves moulded into it . . . deep primary grooves for maximum cushioning to guard against belt carcass rupture . . . and shallow secondary grooves to provide surface softness for protection against belt cover laceration.

For all loading conditions, the cushion idler should be used to support the belt directly under the loading point. It is recommended that three to four units be used, spaced at one-half the normal idler spacing.

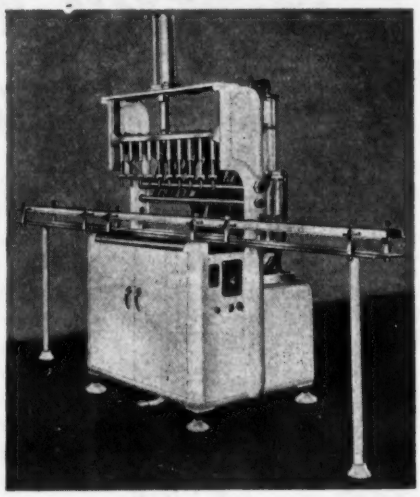
Tests have shown a greater impact absorption capacity for this type design than that of other impact types. The grooving permits greatest possible deflection under impact without impairment of roll stability. The momentary displacement of the rubber instantaneously absorbs the energy of the blow, thus dampening the impact force.

Prevention of Drip from Cold Pipes QC 883

A new development to stop sweating and dripping from cold water pipes has been announced by Mystik Adhesive Products. Self-Stik Dri-Pipe, is a patented insulation which permanently prevents condensation under warm, humid conditions by forming a jacket around the pipe. Installation is simplified because of the adhesive edges on the product with which it is fastened lengthwise to the pipes. Its outer backing is a moisture-proof, resinous-coated cloth which prevents dampness from damaging the soft-pliable insulating material.

Package Weight Adjuster QC 884

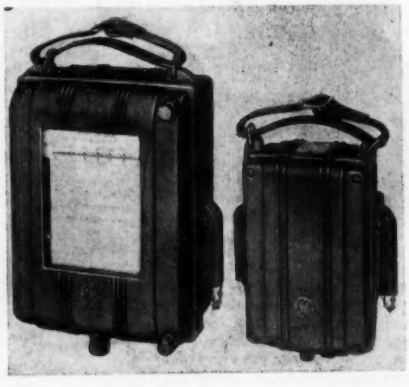
The new automatic weight adjuster of the Fred Goat Co. operates automatically at high speed, receiving partially filled packages from volumetric or rough weight



fillers and adding sufficient material to bring the packages up to the desired gross weight. This is accomplished by having the packages pass through a series of stations at each of which progressively smaller increments of material are added until the package is brought up to the desired final weight. The desired minimum weight is thus positively attained and the maximum overweight tolerance or "give-away" is limited to the smallest and final increment.

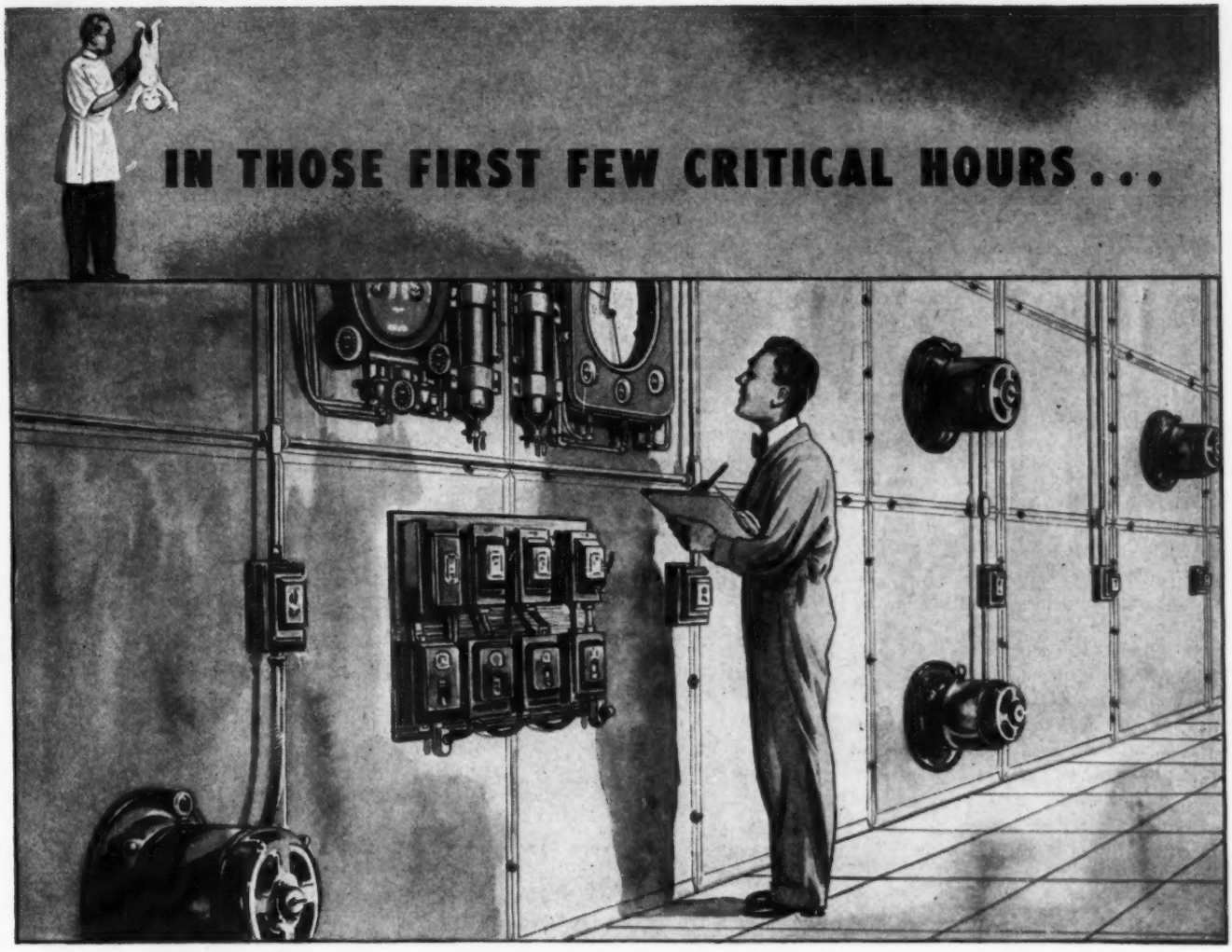
Temperature Recorder QC 885

Announcement of an inkless temperature recorder for use with resistance



temperature detectors already installed, has been made by the Meter and Instrument Division of the General Electric Co.

Designated as the Type CF-2, the temperature recorder consists of a portable recording instrument and an external power-supply unit. The equipment records by means of an inkless recording mechanism on a 4-inch strip chart the temperature variations that produce resistance changes in standard, ten-ohm resistance tempera-



A good doctor knows the importance of his services during the first few critical hours of a new born baby's life. He knows that getting the baby off to a good start adds a great deal to the possibility of a long, healthy life. Proctor engineers take the same attitude with the first few hours of the life of a drying system. It is impossible to place too much emphasis on the first few hours in the life of a piece of equipment as important as a huge dryer. That's why there is a Proctor representative on hand in your plant until the Proctor drying system, just installed, is working perfectly in every detail... meeting every standard laid down in your dryer sales contract. Starting a drying system in operation involves a myriad of details such as properly setting the motors, installing delicate control instruments, making heating element and steam connections, lining up gears and variable speed drives and, finally, coordinating all phases of the operation to assure proper drying. The performance of your Proctor dryer must be all that you expect and all that we promised—before the Proctor representative's work is finished in your plant. Actually, his work in your plant is never finished—for representatives of the Proctor organization are on call at any time in the life of your drying system to help you make adjustments to changing conditions, to assist you in checking results, to help you with the maintenance of that system. From the day your Proctor drying system is installed—until it is replaced—regardless of how long a period of time that may be—we consider it as much our baby as yours—and we want it to be a healthy baby, so that its performance insures your specifying Proctor equipment the next time.

PROCTOR & SCHWARTZ • INC. • PHILADELPHIA 20 • PA •

ture detectors heretofore used mainly with indicating instruments. The range of the fixed scale and chart scale on the recorder is 20-140°C. With a chart length of 65 feet, the driving motor can be adjusted to provide record length of from eight days to two years on a single chart. Weight of the recorder is 11 pounds. Dimensions are 7¼ by 5 by 4$\frac{1}{16}$ inches.

The external power unit contains the constant voltage DC source, a part of the bridge circuit, and a lead-resistance compensating device. The weight of the power unit is 5 pounds. Dimensions are 9¾ by 7⅜ by 6 inches.

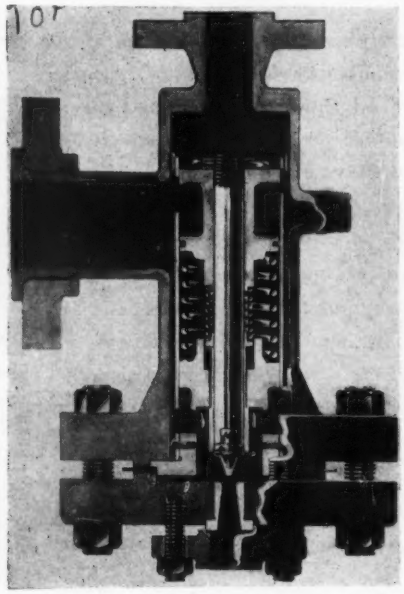
Line-Operated pH Meter QC 886

Pfaltz & Bauer, Inc. are currently offering an inexpensive new type continuous-indicating direct-reading pH meter which is completely line-operated, which thus can be left on continuously as the current consumption is extremely low.

A direct-reading feature of this instrument eliminates time-taking and other bothersome adjustments. Frequent buffer standardizations are also eliminated. The instrument is small and compact in a metal housing and has a large easily read scale graduated to $\frac{1}{10}$th pH. It may be used in connection with a variety of electrodes.

Recirculating Valve QC 887

The Hammel-Dahl Co. offers a recirculating valve to eliminate centrifugal



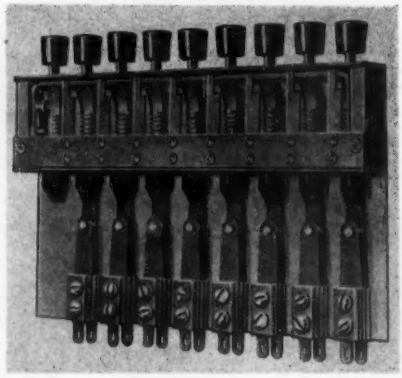
pump failures resulting from insufficient flow of fluid through the pump. Insufficient fluid flow arises from failure of fixed recirculating orifices, failure of prime mover to drive the pump at sufficiently high speed or to restrictions in the discharge piping.

The Hammel-Dahl system consists of an automatic recirculating valve operated from the fluid flow and designed to by-pass the minimum quantity of fluid required to eliminate pump overheating. As the quantity of fluid passing through the pump increases, the by-pass quantity is automatically throttled and is reduced to zero when the output of the pump is sufficient to prevent pump failure.

The valve may be installed in the existing pump piping merely by removing any convenient elbow in the discharge piping upstream of all checks and stops.

Switch QC 888

General Control Co. announces the new "Master" Model MPB, a nine-position push button switch made in both locking

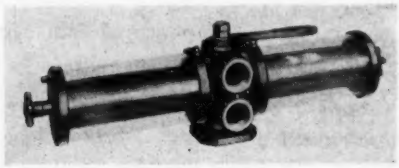


and non-locking frame types. The locking frame type has eight positions and one reset position. In this type, any switching combination which has been set can be released by one operation of the reset button. The contacts are fine silver, permanently riveted to the phosphor-bronze contact springs.

The rating of the "Master Model MPB switch is 5-10 amperes, 125 volts, 60 cycles AC (non-inductive load). It is especially designed for use on electronic and communications equipment.

Duplex Strainer QC 889

A new duplex pipe line strainer has been devised by J. A. Zurn Mfg. Co., made with a transparent Lucite casing



for visual inspection. If inspection shows need for cleaning, flow can be diverted into the other chamber, without loss of pressure, and the filled chamber cleaned with pipe line maintaining normal flow.

Large open area capacities afford free movement of fluids throughout the unit; 16 to 1 ratio with 12" tubes and 8 to 1 ratio with 8" tubes.

Flat horizontal design makes this strainer particularly adaptable to low, close-quarter installations. Strainers are made with bronze bodies, handle, caps, tie rods and nuts; strainer baskets are available in brass. monel or other metal specified.

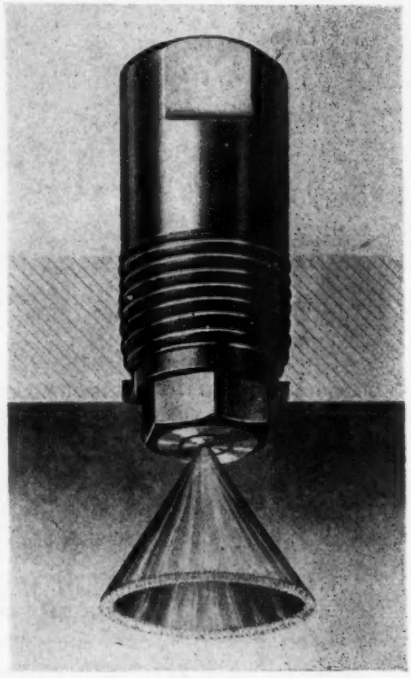
Industrial Clothing QC 890

Addition of a Koroseal work and acid suit to its line of industrial clothing is announced by The B. F. Goodrich Co. Made from best quality textile sheeting, coated black with Koroseal, the suit has been designed for maximum lightness and toughness, including resistance to abrasion and practically all solvents and acids.

Jackets and pants are furnished separately or as a unit. The jacket has a fly front with concealed ball and socket fasteners, strapped armholes and seams and stand-up collar. Pants are the bib type with adjustable shoulder straps in the back.

Wall Mounted Atomizing Nozzle QC 891

A new type hydraulic atomizing nozzle is now available that may be mounted di-



rectly into the wall of processing or machine equipment.

Designed and manufactured by the Spraying Systems Co., these wall mounted atomizing nozzles are made in a variety of materials including brass and stainless steel. The nozzle consists of three parts (1) body (2) cap with stainless steel orifice insert and (3) body with monel metal screen or strainer. Cap and core assemblies are renewable to minimize nozzle costs in operation. Water, oil, solvents, and liquids with similar viscosities may be sprayed. Available in sixteen sizes, these wall mounted atomizing nozzles provide efficient operation at pressures ranging from 10 to 1000 lbs.

New "PRECISION" UTILITY BATH

Temperature range room to 200° C.; accuracy plus or minus 1°

Designed specifically for utility laboratory requirements that demand a compact bath with good sized working chamber, accurate, easy setting controls and rugged construction. The many excellent construction, insulation and operating features provide ample assurance of continued even temperature control within the rated tolerance. Particularly useful to the laboratory with a moderate equipment budget in need of a utility bath capable of filling the requirements for many A.S.T.M. tests.

FEATURES

CONSTRUCTION—Outer jacket is heavy, galvannealed iron, finished in high aluminum. Interior is stainless steel.

HEATING ELEMENT—Steel sheathed immersion heater, capable of bringing bath up to temperature quickly from a cold start.

TEMPERATURE CONTROL AND HEATING MEDIUM—Hydraulic thermostat utilizes a liquid expansion coil which provides uniform, constant temperature. Heating medium is oil, bath capacity 19 gallons.

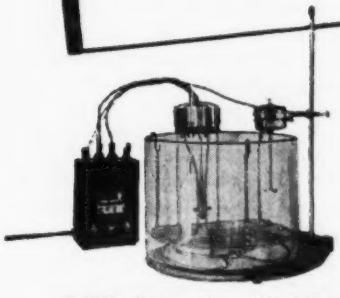
INSULATION—Three inches of glass wool, insulates bath against room temperature fluctuations, reduces wall losses and insures temperature control accuracy and uniformity.

CIRCULATION—Ball-bearing, fully enclosed, resilient mounted, motor stirrer designed specifically for continuous duty.

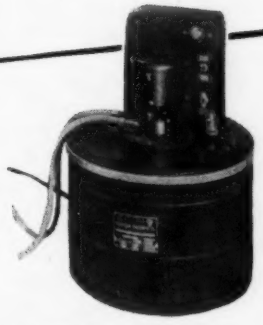
WORKING CHAMBER—18" high x 18" wide x 15" deep Provides ample space for support stand with upper and lower shelf which can be furnished.

ELECTRICAL CHARACTERISTICS—115 Volts, 60 Cycles, A.C. 3000 watts.

SPECIAL NOTE—The "Precision" line of constant temperature baths is unquestionably the largest most complete line ever offered to the laboratory. No matter what your problem is it will pay you to investigate the many standard and specialized "Precision" models available. When ordering specify Catalog No. 10197 A.

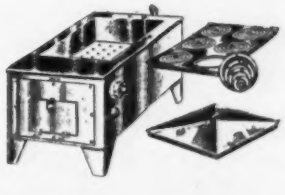


T-9452 Pyrex glass "Visibility" bath for utility use, also for viscosity determination using Ubbelehde or modified Ostwald Viscosimeters. Several standard sizes.



No. 6600 "TEMP-TROL" Constant Temperature circulating system. Self contained. For use with falling ball viscometers, polariscopes, saccharimeters, calorimeters, spectropolariscopes, refractometers, etc.

UNITHERM BATHS. Extremely accurate. Maximum temperature 100° C. Accurately ± .03°. Available in four standard sizes. Also available in Pyrex Glass Visibility Model in two standard sizes.



RECTANGULAR Constant Temperature bath. Maximum operating temperature 100° C. Accurately ± .05° C. Accessories permit a large variety of uses for this bath. Available in three standard sizes.

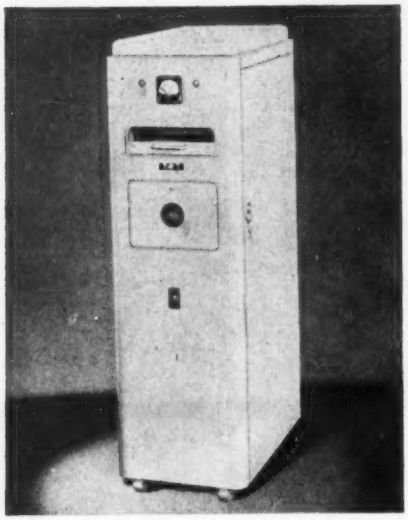
See Your Laboratory Supply Dealer.

PRECISION SCIENTIFIC COMPANY
1736-54 N. Springfield Ave., Chicago 47, U.S.A.
Engineers and Builders of Scientific Apparatus and Production Control Laboratory Equipment for Almost a Quarter Century

per square inch. Atomization provided by hydraulic pressure will be found to be the finest possible for any given pressure. The spray is of hollow cone type, with uniform distribution of atomized liquid.

Dielectric Heater QC 892

The new 18X0 portable Thermex Red Head high frequency dielectric heating unit, built by the Thermex Division of

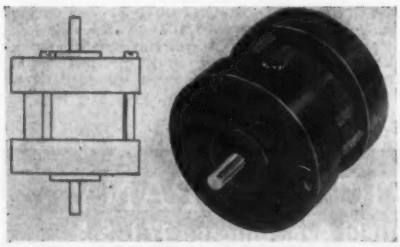


The Girdler Corp., has an output of 1 KW and will raise the temperature of approximately 1 lb. of average general purpose material 170°F in one minute. Only 16¼" wide, it easily slips between presses and affords the advantages of larger models. Control is completely automatic.

The heavy gauge steel cabinet is 16¼" wide, 27¼" deep and 52¾" high. The 10¼" by 13" preform tray. which serves as the bottom electrode, is an aluminum plate; the standard upper electrode is 7½" by 7½" stainless steel wire mesh. Spacing between the electrodes is adjustable from ½" to 3⅜". The drawer accepts preforms up to 2½" in thickness. Closing the drawer all of the way turns on the high frequency energy, which cuts off when the predetermined heating cycle is completed. Manual tuning is dispensed with entirely.

Low Inertia Motor QC 893

A compact, low inertia motor — 60 cycle, 2 phase—for remote control appli-

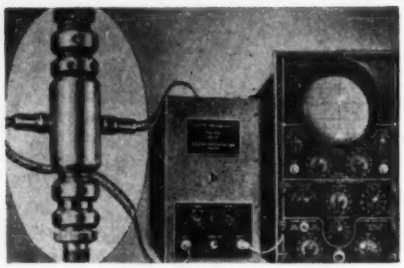


cations has been developed by Transicoil Corp. Designated as Model 2A Servo-Motor, this unit does not run single phase and the fixed phase may be continuously energized. It can be wound to operate from 10 to 80 volts. Impedance is practically constant from full speed to stall, and the standard stall torque, 1½ oz. in. can be changed as required. Stack length may be changed plus or minus 50% to suit torque requirements. This will change the overall length a maximum of ⅜ in.

The Servo-Motor is furnished with separate leads for each phase; terminal board may be attached to rear of motor, if required. Designed for small space application, the Servo-Motor is a midget sized unit that fits inside your hand.

Pressure Measurement QC 894

The new Pressuregraph of Electro Products Laboratories provides, with a cathode ray oscillograph, a substantially linear pressure-time curve on the screen, which indicates the performance of any engine, pump, or other device subject to pressure variations. It shows instantly



the erratic operation of a device which normally cannot be observed by other means, due to inertia of fly-wheels, and other factors.

In addition to dynamic pressure variations. it shows static or slow pressure variations. It covers all mechanical speeds, and pressures up to 10,000 p. s. i. There is no appreciable inertia to overcome in the electronic driving mechanism. The new Pressuregraph provides means for temperature compensation.

Operation is simple. There is only one control. The pick-up is inserted in cylinder, chamber of air-line, etc. The pick-up includes a diaphragm which, when acted on by pressure impulse, unbalances an electronic circuit. The unbalanced voltage from the pick-up is delivered to the Pressuregraph cabinet where it is amplified, and passed through a negative modulation suppressor, and then to the oscillograph. The sweep circuit of the oscillograph is adjusted to the speed of the engine of mechanism under test. A band of light appears on the screen, the contour or shape of which light is the true pressure-time curve. This band of light is not a line or tracing, but an area similar to that of a television picture, and easily readable.

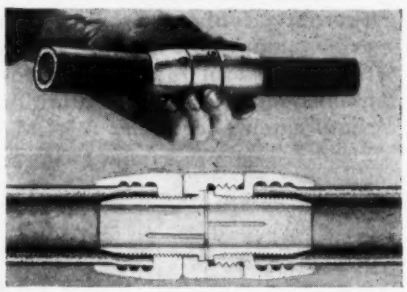
Utility Pump QC 895

The Simer paddle pump is small enough to hold in one hand—yet it operates up to 1750 R.P.M. (direct connected), can be used at pressures up to 30 pounds (70 ft. total head) including a 20 foot suction.

It can be used for pumping out drums, for proportioning chemicals and is inexpensive enough so that several can be used in large operations. It can handle any fluid except those few that destroy tire tread rubber, bronze or stainless steel. The only moving part is the elastic impeller on a stainless steel shaft and contained in a bronze pump case.

Hose Coupling QC 896

A new hose coupling, smaller and lighter in weight than any hitherto in use



and capable of withstanding new maximum pressures, has been announced by the Bar-Way Manufacturing Co.

It was designed primarily for fire fighting, spraying and diving equipment, and recently was officially adopted for use by the U. S. Navy's Department of Salvage.

Developed by the F. A. Bartlett Tree Expert Co., the coupling is designed for working pressures of over 1,000 psi. or more.

The coupling weighs ⅛-½ less than any comparable coupling, and is made of all bronze casting. The full diameter of the hose is maintained throughout the connection with no reduced flow or shrinkage of the hose itself. The couplings are remountable so that broken hose can quickly be repaired in the field.

Production at present is the ½, ¾ and 1¼-inch sizes. It is soon to be made, however, in ⅝, ⅜ and 1-inch sizes.

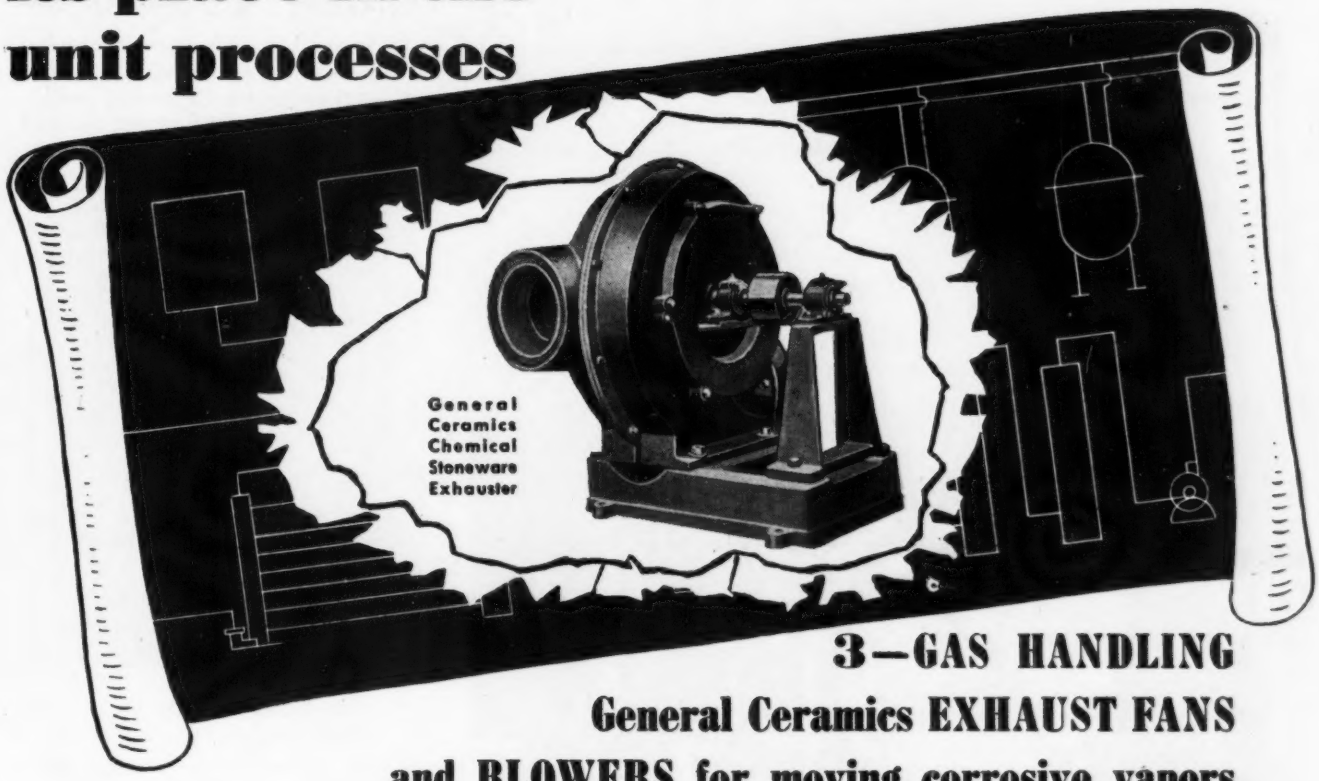
Vacuum Gage QC 897

A new ion gage for continuous measurement of the highest vacuums ordinarily encountered in factory or laboratory processes has been announced by the General Electric Co. Consisting essentially of a control unit and ion gage tube, the equipment measures pressures as low as 10^{-7} mm of mercury and reads directly in millimeters of mercury.

The continuous pressure indication feature permits the detection of small pressure changes and the measurement of slow pressure drifts without the inconvenience of continual adjustments. A protective circuit is provided in the control unit to turn off the gage tube filament automatically at pressures above 10^{-4} mm. The control regulates filament

CHEMICAL STONEWARE

its place in the unit processes



3—GAS HANDLING

General Ceramics EXHAUST FANS and BLOWERS for moving corrosive vapors

Two related problems—commonplace but difficult to solve—are the moving of corrosive vapors necessary in a process and exhausting such offensive and noxious fumes as are neither necessary nor desirable.

Yet both of these problems, with innumerable variations in different plants, have been solved repeatedly with General Ceramics Stoneware Exhausters. Stoneware is an ideal material for this equipment; stoneware is not only corrosion resistant but, with all acids except hydrofluoric, actually corrosion *proof*.

For maximum protection outside as well as in, General Ceramics Exhausters are made with the stoneware housing completely enclosed in a cast iron shell. Steel shaft of the stoneware impeller is protected by a stoneware sleeve, accurately ground for free running and minimum leakage. Before machines are assembled, all impellers are tested to 50% above their top working speed.

Unrivalled suitability to their purpose—assured by stoneware's inherent properties and General Ceramics' skill in fabricating it—has made stoneware exhausters indispensable in some industries and has led to their adoption as standard equipment in many more. Four sizes of exhausters with capacity ranges from 50 to 3800 CFM are available.

If you are having difficulty with the handling of corrosive gases, or seeking to forestall it, SEND FOR BULLETIN RA and REPRINT. It describes the construction, installation and operation of General Ceramics exhaust fans and blowers in detail.

General Ceramics engineers, experienced in all phases of corrosive gas handling, offer cooperation in the design and selection of this apparatus. For general bulletin or specific help, address any General Ceramics office.

GENERAL CERAMICS AND STEATITE CORPORATION
CHEMICAL EQUIPMENT

BUFFALO: 610 Jackson Bldg. **CHICAGO:** 20 N. Wacker Drive
LOS ANGELES: 415 So. Central Ave. **PORTLAND 5, ORE.:** 410 New Fliedner Bldg.
NEW YORK: 30 Broad Street • **SEATTLE:** 1411 Fourth Ave. • **SAN FRANCISCO:** 598 Monadnock Bldg.
TACOMA: 417 Tacoma Bldg. • **HOUSTON:** 2015 Second National Bank Bldg.
MONTREAL: Canada Cement Bldg. • **TORONTO:** Richardson Agencies, Ltd., 454 King St., West
VANCOUVER, B.C.: Willard Equipment Ltd., 860 Beach Ave.

General Ceramics AND STEATITE CORP.

CHEMICAL EQUIPMENT DIVISION
KEASBEY, NEW JERSEY

In addition to the manufacturing facilities of the Chemical Equipment Division those of the Insulator Division are also available for handling ceramic problems in all branches of industry. General Ceramics & Steatite Corporation is therefore able to offer service covering all industrial applications of ceramic products.

emission against line voltage and pressure changes, assuring stable and accurate operation.

The ion gage control unit includes the emission regulator circuit, a stabilized voltage supply, an electronic microammeter with indicating instrument, and the filament protective relay. The front panel contains all controls necessary for operation of the ion gage. The gage tube is a special glass triode with a tubulation for connecting to the vacuum system.

Dielectric Heater QC 898

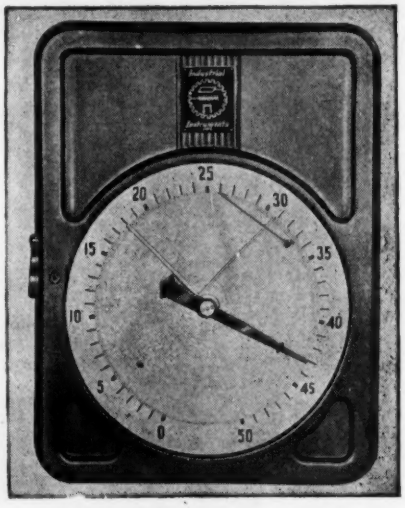
A new electronic heater for dielectric heating of plastic preforms has been announced by the Industrial Heating Division of the General Electric Co. It is designed for operation at 40 megacycles, using a water-cooled oscillator tube. This tube, operating at a high frequency and having a generous short-time overload capacity, makes possible the use of an average full-power 5-kw output during the entire heating cycle.

After the plastic preforms are placed on the electrode of the oven-like preheater and the cover is closed, the preheat cycle is started by means of a push-button station. The rest of the operation is entirely automatic. The oven cover opens automatically at the end of the preset heating cycle, and the operator then transfers the preforms to the adjacent molding press.

Small enough to fit conveniently between two molding presses, the new heater is able to accommodate the alternate operation of the two presses. All controls except push buttons are located behind the locked front door to prevent tampering. The heater is mounted on casters so that it can be readily moved from location to another.

Conductivity Recorder QC 899

A means of continuously and permanently recording electrolytic conductivity of solutions by the Solubridge method, is now provided by the Type RP recorder offered by Industrial Instruments, Inc.

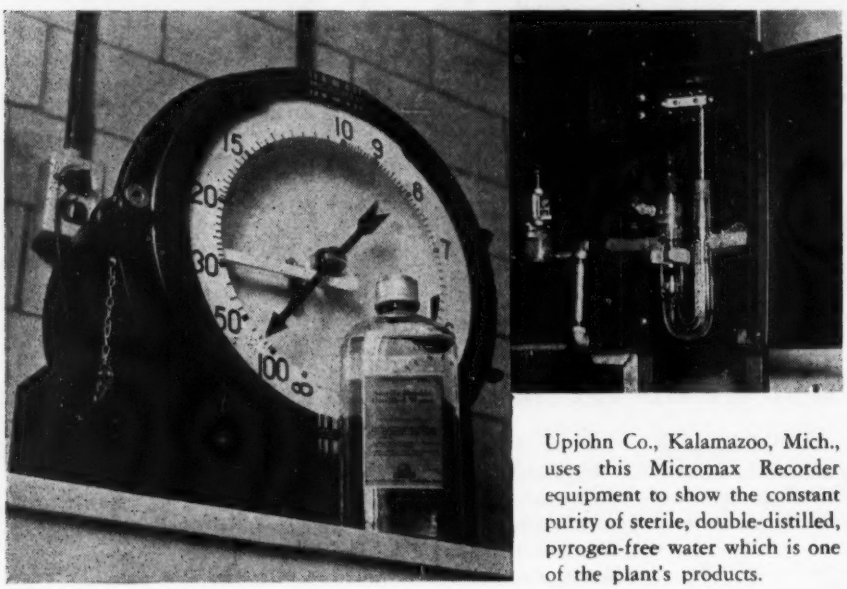


The Solubridge recorder incorporates an AC Wheatstone Bridge circuit operating on the null balance principle. The accuracy is consequently made independent of line-voltage fluctuations and vacuum-tube characteristics. The instrument can be furnished for 1, 2, 3 or 4 continuous-line records on the same 12-inch diameter circular chart, a separate amplifier and motor-driven slide wire being used for each recording pen so that no switching devices are necessary. All pens of a multiple-pen recorder may move at any time or simultaneously. The slide wire unit mounts on the inside of the hinged panel immediately in back of the front door.

Housed in a sturdy metal cabinet, the instrument shows the circular recording chart through the glass window. The indicator pointer is arranged with a magnetic lock so that operation of the chart release lever lifts both indicator pointer and recording pens, leaving the chart free for exchange. The indicator can operate in conjunction with only one pen, and its use therefore limits the recorder to a maximum of three pens instead of the maximum of four.

Gas Analyzer QC 900

A new thermal gas analyzer, Type TB, for continuously recording or indicating the concentration of one component of mixed gases whose characteristics can be detected by the thermal-conductivity principle, has been announced by the General Electric Co. The new instrument can



Upjohn Co., Kalamazoo, Mich., uses this Micromax Recorder equipment to show the constant purity of sterile, double-distilled, pyrogen-free water which is one of the plant's products.

GUARDIAN For a Water Still

An overall check of the purity of water from any automatic still is provided by a Micromax Recorder of the type shown here.

This instrument can warn the chemist or biologist against such difficulties as using water before entrained air has been swept out of the still. It also warns if improper or careless operation causes foaming or priming, and thus carries undistilled water to the effluent. Regardless of cause, if the effluent isn't of the desired conductivity, the Micromax indicates the fact, and can of course operate an alarm light or bell if required.

One of the equipment's greatest advantages, in a large laboratory, is that the automatically-drawn record chart gives written proof of water purity.

Catalog EN-95 describes the equipment and will be sent on request, but if you have a definite application in mind, an L & N engineer will be glad to supply individualized information.

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Jrl Ad N-95 (3b)

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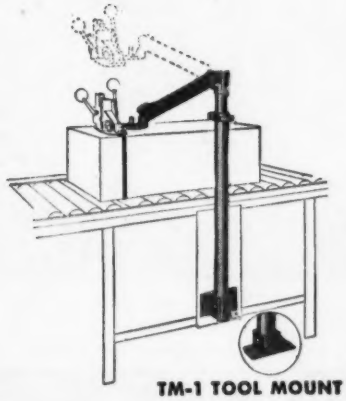

TM-1 TOOL MOUNT

Counterbalanced arm swings strapping machine into correct working position easily and smoothly. After strapping is completed, the machine automatically rises free from the package as indicated.

Just ONE tool—but it tensions, cuts and seals—*all in quick, easy, effortless motion.* The A-2 is unequalled for fast, low-cost strapping applications—particularly on centralized or conveyor systems. It's sturdy, lightweight . . . and outstanding in speed, convenience and simplicity of operation. Uses are almost unlimited . . . the A-2 straps boxes, cartons, crates or packages in a wide range of sizes and weights for countless industries. *Check its advantages in terms of your own shipping room.*

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A-2 now available for strap sizes: ⅜"x.015, ½"x.015, ⅜"x.020, ½"x.020.

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STEEL STRAPPING

be used over a wide range of gases and gas concentrations and can detect impurities in hydrogen, carbon dioxide, sulphur dioxide, or any one of many organic vapors provided the impurity has a different thermal-conductivity from that of the gas being analyzed.

In order to adapt the analyzer to varied applications, a different reference gas can be obtained for each application. A change of the instrument scale and a new cell block, which contains the reference gas, permits an analyzer designed for one atmosphere to be applied to one that is radically different.

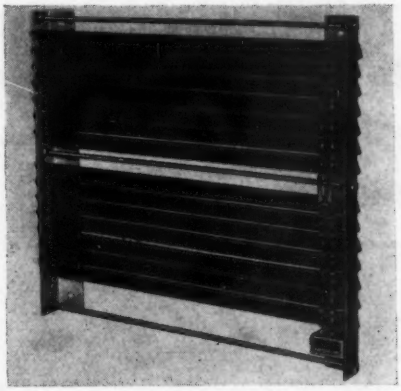
Gas analysis is registered on any standard indicating or recording instrument, which can be equipped with contacts for closing an alarm circuit when the concentration reaches a preset maximum or minimum value. In addition, these contacts can be used to control circuits for valves or motors in order to maintain the gas concentration within certain limits.

The new instrument features high sensitivity, rapid response to gas changes, and sealed-in reference gas for reliable operation. The cell clock is thermostatically controlled to prevent temperature errors.

Oven Heater QC 901

A new Chromalox oven heater, Type NOU Modified, has been developed by E. L. Wiegand Co. for use at 950°. Heating element terminals are centralized at one end of the assembly, and all electrical connections are brought to a single enclosed terminal box to simplify wiring.

The assembly consists of fourteen high temperature chrome steel sheathed strip



heaters, giving a combined rating of 8 kw. at 230 volts. End brackets of heavy sheet metal are punched to permit mounting to either walls or bottom of the oven. The strip heater elements are mounted in the end brackets at a slight angle to the mounting surface to encourage air circulation if the heaters are mounted on the walls of the oven.

On oven applications where forced air circulation is employed, the assemblies may be used as air duct heaters with slight change in the position of the strips. Any number of these assemblies may be mounted to increase the heating capacity. This oven heater is 33½" long, 28" high and 3" deep. Both the physical dimensions and the electrical rating may be altered to suit specific requirements. The heaters are furnished for single phase operation, only.

Potentiometer-Pyrometer QC 902

A new electronic potentiometer-pyrometer which has no continuously moving or vibrating parts in its measuring circuit is announced by Bailey Meter Co. It records one or two temperatures on a 12" diameter uniformly graduated chart and indicates on a 29" bold scale which encircles the recording chart.

This indicating, recording and controlling instrument requires a 115 volt, 60 or 50 cycle, AC power supply. It operates from a thermocouple or from any source of DC potential which varies through at least 10 millivolts for full scale range. Conventional thermocouples are used for temperatures up to 3000°F. For temperatures above 3000°F and for moving objects above 1500°F radiation type thermocouples are used.

The DC potential of the thermocouple or other primary element is balanced against a conventional potentiometer circuit employing the usual battery source and a standard cell with manual standardization. Instead of a galvanometer or millivoltmeter the Bailey Pyrotron Potentiometer circuit employs a DC to

MODEL **JK** 2 Station Automatic

VOLUME FILLER & PACKER — GROSS WEIGHER

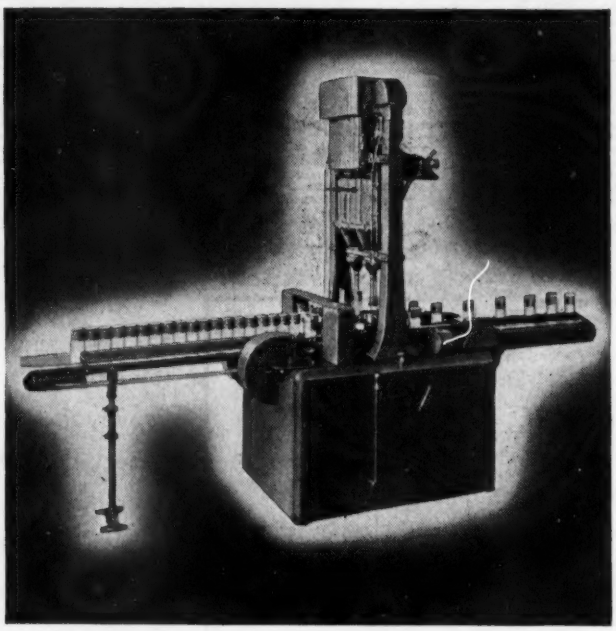
For all types of powdered and granular chemicals

The Model JK is an Automatic Packer that will also operate as a Volume Filler or Gross Weigher. This machine fulfills every requirement for advanced means of automatically handling powdered, granular and paste materials of almost all descriptions.

The Model JK has two filling stations. When the machine is used as an Automatic Volume Packer the empty containers are elevated, causing the actual filling to take place under the amount of controlled pressure suitable for the type of material and the size of container into which it has to be packed. This same principle is used when the machine is equipped as a Packer-Weigher, except that the main portion of the contents is packed under pressure, the remainder finished by weighing for accuracy. When the machine is used as a Volume Filler or Gross Weigher, provision can be made to incorporate a vibrating type of settling device to settle the material after filling.

The machine can be equipped for intermittent conveyor motion to facilitate handling of oval or irregularly shaped containers. With this intermittent motion, the conveyor moves just enough to deliver one container at the transfer station, thus preventing climbing and piling up of the containers.

The many new automatic features, plus the speed and accuracy of the JK, soon pay for the machine through savings on labor costs alone. It will pay to get full details and specifications—there are many features never available before—write today for bulletin which gives complete data on the Model JK!



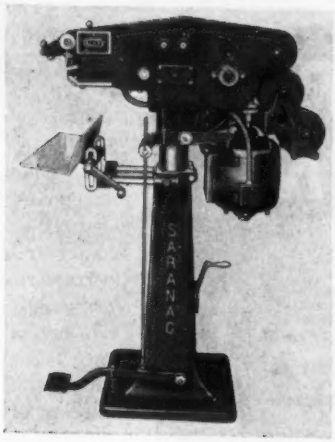
Send U.S. details on any of your packaging problems —we have the machines and the engineering background to help solve them.

US *Automatic Box Machinery Co. Inc.*

as many as

800 CLOSURES AN HOUR on the SARANAC

MODEL
D - 10″
STANDARD
BAG
SEALER



Paper bags can be securely, economically, almost hermetically sealed on the D-10″. Folding and stapling operations are automatically performed in a single stroke. The resultant stapled fold is the strongest part of the bag — and it's sift proof.

Saranac Model D-10″ is designed to operate at a rate of 75 closures per minute but since output depends upon the skill and ability of the operator, accurate estimates of daily production vary. However, records show outputs of 600 to 800, and even as high as 1200, closures per hour.

Write today for Bulletin 154-C76. It gives you full details about SARANAC'S economical licensing plan.

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Methanol—Methyl Acetone
Methyl Acetate
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Denatured Alcohol
Turpentine—Rosin
Benzol—Toluol—Xylol
Sodium Benzoate U. S. P.
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Mine: Newgulf, Texas

AC converter and an electronic detector, to measure potentiometer unbalance.

Thermostat QC 903

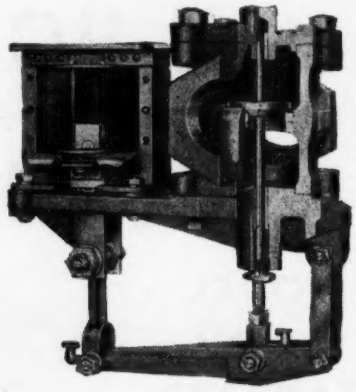
The new Type O thermostat of United Electrical Controls Co. is of the remote bulb type. It is designed for industrial applications requiring accurate control over narrow calibrated ranges. It can be used on all liquids or gases and can be equipped with ambient temperature compensation. It can be supplied in stainless steel or brass.

The control action is based on a snap action switch actuated by a liquid-filled copper thermal assembly, which can be adjusted by either knob or pointer with a calibrated dial, or by screw driver. The adjustments cover any 120°F or 250°F in the range from —120°F to 600°F, and screw driver adjustments cover entire ranges from —120°F to 180°F, from 50°F to 350°F, or from 50°F to 600°F.

Solenoid Valve QC 904

The new solenoid valve of the Johnson Corp. combines immediate full flow with the ability to operate under differential pressures as high as 150 lbs. It can be used for all types of liquid level control, with hot and cold water, steam, oil and other processing liquids.

This new Johnson Valve is direct-acting—not pilot operated and a lever arrangement provides ample power to insure positive opening of the valve.



Single seat construction, the manufacturer points out, eliminates the trouble sometimes encountered with pilot operated valves when silt or other foreign matter freezes the piston. It also greatly increases the temperature range, handling hot liquids or steam up to 365°F.

In normal position the valve is closed; when solenoid is energized the valve opens instantly to full capacity. There is no time lag or delay, and no wire drawing of valve or seat that often results when valves open and close slowly. The manufacturer states that its dependable, trouble-free operation has been proved in test installations which have been in service for as long as 3 years.

The new Johnson Valve is designated as a globe screwed type, and is designed and built for heavy duty service. Body of the valve is of cast iron or bronze, tested for 150 lbs. pressure, with top cap and bottom section bolted to body. Valve, seat and valve stem are stainless steel.

The Johnson valve is available in two series. Type HH, sizes from ½ inch to 1½ inch, is suitable for differential pressures ranging from 125 to 150 lbs; Type HL, sizes 1 inch to 3 inches, is for medium and low differential pressures. Standard models are furnished for operation 110, 220, or 440 volt 60 cycle-current.

Drum Sling QC 905

Specifically designed for the hoisting of drum type containers, the Trylon safety drum sling of the Wind Turbine Co. makes possible the handling of heavy drums, barrels, and similar items with both safety and ease. Heavy clips mounted on a rod with an adjustable pressure spring at each end grip the container securely until it is deliberately released. The spacing of these clips can be quickly altered and put in place to fit any size barrel, drum or keg. The sling is equipped with 5/16" plow steel wire rope and has a minimum breaking strength of 8,000 pounds. The entire assembly is hot dip galvanized to prevent rust.

FOR QUICKER, EASIER GRINDING USE "ROLLER-TYPE" JAR MILLS

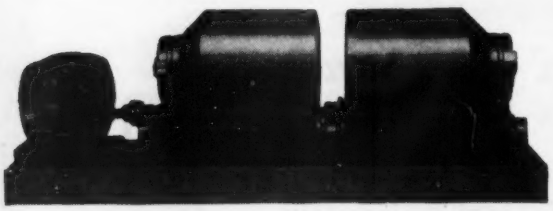
No cumbersome clamping into frames or housings—just set the jars on the rubber-covered rollers—and let them roll.

THERE just isn't anything like the ease and convenience of these "Roller-type" Jar Mills for grinding or pulverizing chemicals, pigments, minerals, etc. Savings in time and jar breakage alone quickly pay for the cost of the unit. Sturdy, rugged construction for long maintenance-free service; positive gear drive for smooth, certain grinding action. Revolving speed (with 1½ gal. jar about 50 R.P.M.).

Standard sizes accommodate one, two, three or four jars of the 1, 1½ or 2 gallon size. Larger sizes on special order.

"ROALOX" JARS

Positive locking white chemical stoneware wide-mouthed mill jar. Five standard sizes in capacities from 2¼ to 54 pints. Gasket comes out with cover. Rolls smoothly. For "Roller-type" or "standard" jar mills.



Write today for new Bulletin 210-G which describes and illustrates "Roller-type" Jar Mills, standard Jar Mills, Ball Mills, Adjustable Drum Rollers, Revolving Drum Tumblers, Chemical Stoneware, Porcelain and Steel-Jacketed Mill Jars.

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A new highly efficient ultraviolet light absorbent when in solution, also a highly fluorescent material, now commercially available. Odorless, neutral, white powder, very soluble in all alkaline medium, insoluble in neutral and acid medium. Suggested uses—in suntan oils, soaps or wherever the effects of sunlight are detrimental.

SAMPLE AND INFORMATION ON REQUEST

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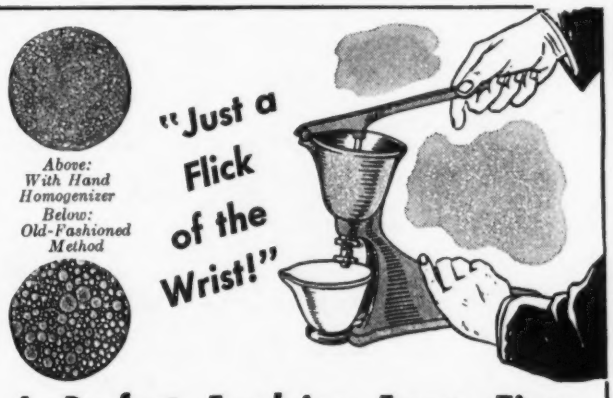
Manufacturers of Fine Industrial Chemicals



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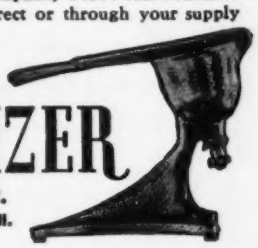
Why take chances with valuable "lab time" when you can be sure of better results with Laboratory Homogenizer? Gives emulsions instantly, with permanent suspension when ingredients are in correct ratio. Ideal for small batches. Hundreds of laboratories use Laboratory Homogenizer because it gets *better results faster.*

Easy to operate and keep clean. Nothing to jam or break. Made of hammered aluminum; 10½" high. Capacity 1 to10 ozs. Available in quantity *now.* $6.50 complete, direct or through your supply house. *Satisfaction guaranteed.*



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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Safe Handling Of Benzene

The hazards of benzene, together with precautions to be taken against injury, are comprehensively treated in "Chemical Safety Data Sheet—Benzene", published by the Manufacturing Chemists' Association of the United States, Washington, D. C. Designed for supervisory staffs and management, this manual presents in concise form essential information on the safe handling and use of chemical products. It is the second of a series of product safety manuals being prepared by the Association.

T. Pat Callahan

Bureau of Explosives Reports on Rail Accidents

Last month a brief summary of the Bureau of Explosives' annual report was given in these columns. Several tables appearing therein which are of particular interest to shippers of chemicals are presented this month in these pages.

TABLE 1.

RECORD OF REPORTED ACCIDENTS OCCURRING DURING 1945 IN THE TRANSPORTATION BY RAIL FREIGHT AND RAIL EXPRESS OF DANGEROUS ARTICLES OTHER THAN EXPLOSIVES INCLUDED IN THE I. C. C. LIST

Article	*No. of Instances*	*Fires**	*Persons Injured***	*Property Loss*
Acetone	7	1	0	$8,832
Acid, Liquid, N. O. S.	13	0	6	32
Acid, Formic	3	0	0	45
Acid, Hydrobromic	1	0	0	15
Acid, Hydrochloric	27	0	1	597
Acid, Hydrofluoric	7	0	2	2,214
Acid, Nitrating (Mixed)	5	0	0	395
Acid, Nitric	47	18	0	30,091
Acid, Perchloric	3	2	0	8,316
Acid, Sludge	1	0	0	1
Acid, Spent	1	0	0	1
Acid, Sulfuric	95	0	3	8,212
Alcohol	29	1	0	23,049
Amyl Acetate	1	0	0	1
Anti-Freeze Compounds, Liquid	1	0	0	1
Arsenic Trichloride	2	0	0	3
Automobiles With Charged Electric Storage Batteries	2	2	0	2,403
Batteries, Storage	189	2	1	2,142
Benzol	5	1	0	342
Benzyl, Chloride	1	0	0	20
Carbon Bisulfide	6	2	0	4,648
Caustic Soda, Liquid	6	0	1	3,222
Cement, Rubber	1	0	0	100
Charcoal	27	27	0	8,406
Chemicals, N. O. S.	1	1	0	500
Chlorosulfonic Acid	4	0	0	16
Chlorpicrin, Liquid	1	0	0	1
Chromic Acid Solution	1	0	0	1
Coal Tar Light Oil	2	1	0	5,800
Compounds, Cleaning Liquid	5	0	0	21
Compounds, Iron or Steel Rust Preventing or Removing	6	0	1	36
Compound, Lacquer Thinning, Liquid	2	0	0	82
Compound, Paint Removing, Liquid	2	1	0	5
Compound, Varnish Reducing	1	0	0	1
Corrosive Liquid, N. O. S.	4	0	3	295
Cyanide or Cyanide Mixtures	1	0	0	12
Distillate	5	0	0	41
Electrolyte	3	0	0	1,923
Ether	1	0	0	12
Ethyl Acetate	2	0	0	14
Ethyl Chloride	2	0	0	12,005
Ethyl Ether	1	0	0	1
Ethylene Dichloride	1	0	0	115
Ethyl Methyl Ketone	2	0	0	6
Fibers or Fabrics with Animal or Vegetable Oil	9	9	0	28,136
Fish Scrap or Fish Meal	5	5	0	1,080
Gas Compressed, Anhydrous Ammonia	1	0	0	1
Gas Compressed, Chlorine	4	0	1	21
Gas Compressed, Hydrogen	1	1	0	1
Gas Compressed, Hydrogen Chloride	1	0	0	100
Gas Compressed, Liquefied Petroleum	27	1	0	2,281
Gas Compressed, Methyl Chloride	2	0	0	23
Gas Compressed, Oxygen	1	1	0	20,161
Gas Compressed, Sulfur Dioxide	1	0	0	5
Gas Drips, Hydrocarbon	1	0	0	505
Gasoline	223	11	0	160,497
Hydrogen Peroxide	7	5	0	15,184

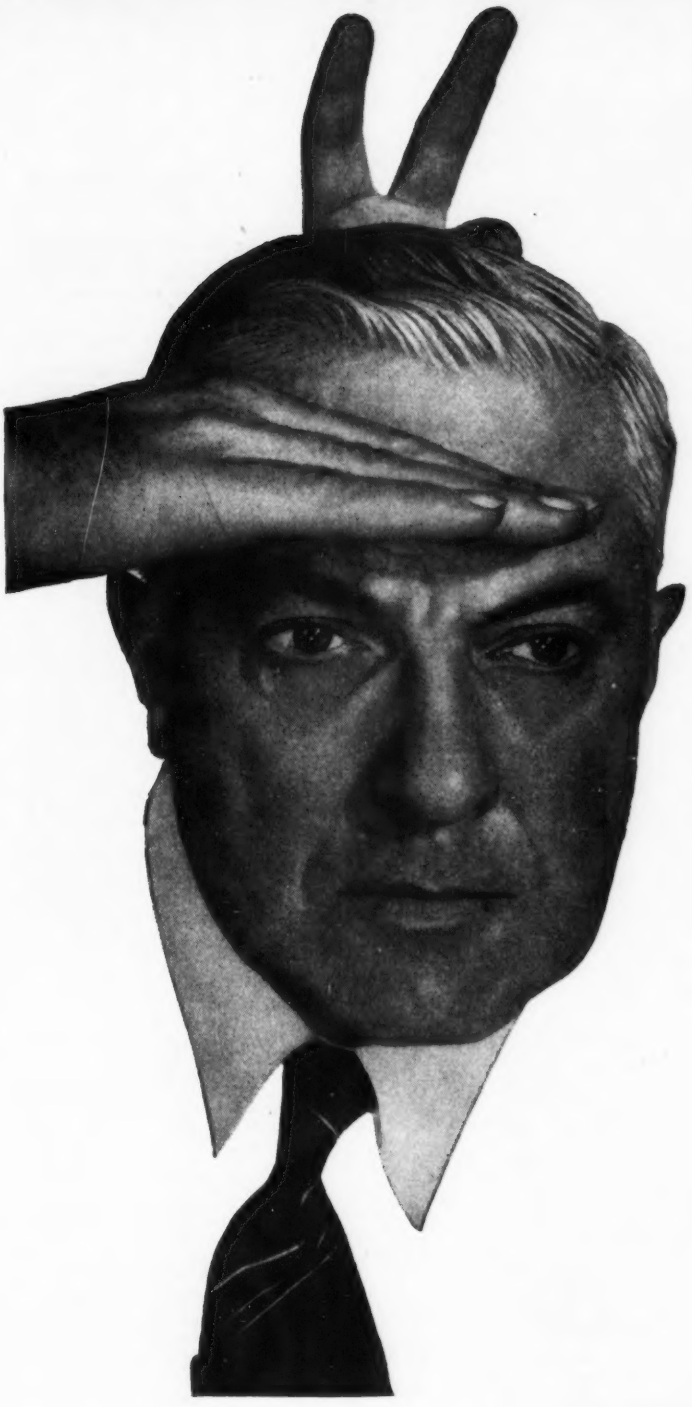
(*Continued on page 118*)

TABLE 2.

FIRES, EXPLOSIONS, FATALITIES, AND PERSONAL INJURIES AND CAUSES THEREFOR, REPORTED DURING 1945, IN RAIL FREIGHT AND RAIL EXPRESS TRANSPORTATION

Article	*No. of Instances*	*Fires*	*Explosions*	*Persons Killed*	*Persons Injured*	*Cause*
Acetone	1	1	0	0	0	Derailment.
Acid, Liquid, N. O. S.	6	0	0	0	6	Failure of shipper to replace vent pipe nipple and cap on tank car resulted in acid splashing out of nipple on dome and burning yard brakeman's face and clothing—1. Contents from "empty" carboys which had not been drained completely resulted in five persons being burned—5.
Acid, Hydrochloric	1	0	0	0	1	Contents from "empty" carboys, which had not been drained completely, resulted in one person being burned.
Acid, Hydrofluoric	1	0	0	0	2	Believed some chemical reaction occurred in the material, causing sufficient internal pressure to rip head off drum. Two freight handlers burned.
Acid, Nitric	18	18	0	0	0	Rough handling—5. Defective containers—4. Improper loading—1. Shipment improperly prepared—5. "Empty" carboys not drained completely loaded on their sides, resulting in some of the acid leaking out and causing fire—1. Unknown—2.
Acid, Perchloric	2	2	0	0	0	Improper loading—2.
Acid, Sulfuric	3	0	0	0	3	While tank car was being switched, acid splashed out from open vent on dome of car, resulting in one person being burned—3.
Alcohol	1	1	0	0	0	Derailment.
Automobiles with Charged Electric Storage Batteries	2	2	0	0	0	Short circuit—2.
Batteries, Electric Storage	3	2	0	0	1	Battery placed on floor in a careless manner, resulted in escape of acid through the vented cap. Some of the acid splashed in the trucker's eye, requiring medical attention—1. Defective container—1. Improper loading—1.
Benzol	1	1	0	0	0	Defective container.
Carbon Bisulfide	2	2	0	0	0	Rough handling—2.
Caustic Soda, Liquid	1	0	0	0	1	Dome cover on tank car came off when tank was being coupled to other cars. Contents splashed from tank car and resulted in brakeman being burned. Dome cover not properly applied by shipper's employes.
Charcoal	27	27	0	0	0	Spontaneous combustion—27.
Chemicals, N. O. S.	1	1	0	0	0	Shipment improperly prepared.
Coal Tar Light Oil	1	1	0	0	0	Defective container.
Compounds, Iron or Steel Rust Preventing or Removing	1	0	0	0	1	"Empty" carboys not completely drained resulted in railroad employe being burned from liquid running out of carboy.
Compound, Paint Removing Liquid	1	1	0	0	0	One carton noted leaking. Truck driver lighted match and open flame caused leaking carton to burst into flames.
Corrosive Liquid, N. O. S.	1	0	0	0	3	Cover of drum had fallen off in transit and three freight house employes were burned from liquid which had splashed out from the drum.
Fibers or Fabrics, with Animal or Vegetable Oil	9	9	0	0	0	Material improperly prepared for shipment—9.
Firearms, Loaded	1	0	1	1	0	While package containing loaded firearm was being loaded in car, express employe was killed by accidental discharge of the firearm.
Fireworks	6	6	0	0	0	Improper loading—1. Spontaneous combustion—2. Shipments improperly prepared—3.
Fish Scrap or Fish Meal	5	5	0	0	0	Spontaneous combustion—5.
Gas, Compressed, Chlorine	1	0	0	0	1	Slight leak at base of valve of "empty" cylinder, resulted in one person requiring medical attention.
Gas, Compressed, Hydrogen	1	1	0	0	0	While express messenger was pulling cylinder along the floor of car with a hook, the valve

(*Continued on page 118*)



The Big Chief on "lookout" for a better steel pail

You don't have to look very far for the best in steel shipping containers. Continental makes a complete line of top quality light and heavy gauge pails and drums, large and small, for hundreds of different items—liquid, solid, semi-solid, and dry bulk products. Each is backed by Continental's Triple-C trademark and nation-wide service facilities.

Right now our production is limited but just as soon as sufficient material is released, you'll be hearing from us.

A COMPLETE LINE OF STEEL SHIPPING CONTAINERS

The Triple-C means best in quality, service

CONTINENTAL CAN COMPANY

100 East 42nd Street, New York 17, N. Y.

TABLE 1. (*Contd.*)

Article	No. of Instances	Fires*	Persons Injured*	Property Loss
Inflammable Liquid, N. O. S.	8	0	0	547
Inflammable Solid, N. O. S.	1	1	0	469
Insecticide, Dry	1	0	0	15
Insecticide, Liquid	2	0	0	28
Isopentane	6	1	1	561
Isopropanol	1	0	0	3
Lacquer	6	0	0	31
Magnesium, Metallic, Powered	1	0	0	20
Matches, Strike-Anywhere	52	49	0	26,792
Methyl Acetone	1	0	0	1
Motor Fuel Anti-Knock Compound	4	0	0	3,460
Mustard Gas	1	0	0	1
Naphtha	18	2	0	164,974
Naphtha Solvent	1	0	0	5
Oil, Crude	99	2	0	38,192
Paint	1	1	0	1,540
Phosphorus	5	5	0	163
Phosphorus Trichloride	1	0	0	98
Poisonous Liquid, N. O. S.	3	0	0	1,981
Rags, Wet	1	1	0	1
Shellac, Liquid	1	0	0	1
Sodium Peroxide	2	2	0	8,871
Sulfur Chloride	2	0	0	29
Tear Gas Material, Liquid	2	0	0	2
Tin Tetrachloride, Anhydrous	1	0	0	279
Titanium Tetrachloride	1	0	0	20
Toluol	3	0	0	35
Varnish, N. O. I. B. N.	1	0	0	1
Totals	1,036	156	20	$600,090

* There were no explosions.
** No persons were killed.

TABLE 3.

RECORD OF REPORTED INSTANCES CAUSING FIRES, FATALITIES, INJURIES OR PROPERTY LOSS OCCURRING IN RAIL EXPRESS TRANSPORTATION OF ARTICLES INCLUDED IN I. C. C. LIST OF DANGEROUS ARTICLE OTHER THAN EXPLOSIVES DURING 1945

Article	No. of Instances	Fires*	Property Loss
Acid, Liquid, N. O. S.	1	0	$ 1
Acid, Hydrochloric	4	0	2
Acid, Nitric	5	4	78
Acid, Sulfuric	2	0	3
Batteries, Storage	4	0	1
Caustic Soda, Liquid	1	0	1
Compounds Cleaning, Liquid	1	0	17
Compound, Paint Removing, Liquid	1	0	1
Corrosive Liquid, N. O. S.	1	0	1
Fibers or Fabrics, with Animal or Vegetable Oil	3	3	13,050
Gas Compressed, Chlorine	1	0	15
Gas Compressd, Hydrogen	1	0	1
Gas Compressed, Hydrogen Chloride	1	0	100
Gas line	2	0	1
Inflammable Liquid, N. O. S.	2	0	6
Matches. Strike-Anywhere	4	4	4
Oil, Crude	1	0	1
Phosphorus	1	0	1
Sulfur Chloride	1	0	1
Totals	37	11	$13,285

* No explosions, injuries nor fatalities.

TABLE 2. (*Contd.*)

Article	No. of Instances	Fires	Explosions	Persons Killed	Persons Injured	Cause
						started to leak and hydrogen was ignited by an open gas light in the car.
Gas, Compressed Liquefied Petroleum	1	1	0	0	0	Petroleum gas leaking through gasket around dome of tank car. When inspection was being made by car inspector, he set his carbide lantern on running board and escaping gas became ignited.
Gas, Compressed Oxygen	1	1	0	0	0	Car and contents destroyed by fire. Cause unknown.
Gasoline	11	11	0	0	0	Derailment—3; ignition by friction sparks—8.
Hydrogen Peroxide	5	5	0	0	0	Improper loading—1. Leakage from "empty" drums not completely drained, resulted in fire —3. A German tank car, complete with flanged wheels and other appurtenances, was loaded on flat car. During switching operation fire discovered on floor of flat car. Fire extinguished and inspection of car showed leakage from dome caused by asbestos gasket out of position—1.
Inflammable, Solid, N. O. S.	1	1	0	0	0	Spontaneous combustion.
Isopentane	1	1	0	0	1	A small stream noted leaking from tank car due to overflow from dome which seeped through the insulation and leaked out at the bolster. Fire followed. A carman slightly burned trying to repair the leak.
Matches, strike-Anywhere	49	49	0	0	0	Negligence of employee—11. Rough handling—8. Improper loading—21. Unknown—9.
Naphtha	2	2	0	0	0	Derailments—2.
Oil, Crude	2	2	0	0	0	Derailment—2.
Paint	1	1	0	0	0	Material improperly prepared for shipment.
Phosphorus	5	5	0	0	0	Negligence of employe—3. Defective container —1. Unknown—1.
Rags, Wet	1	1	0	0	0	Spontaneous combustion.
Sodium Peroxide	2	2	0	0	0	Improper loading—1. "Empty" steel drum with removable head off found on car floor with a considerable amount of sodium peroxide on car floor near the head of drum. When one trucker turned the drum up on its bottom and another trucker ran his truck under the drum in the act of loading, the head of the drum struck the powder on the floor, causing it to ignite, resulting in fire that developed rapidly—1.
Totals	179	162	1	1	20	

TABLE 5.

SUMMARY SHOWING RAILWAY TRANSPORTATION (RAIL FREIGHT AND RAIL EXPRESS) LOSSES CHARGEABLE TO EXPLOSIVES AND OTHER DANGEROUS ARTICLES

Class	No. of Instances	Fires	Explosions	Persons Killed	Persons Injured	Property Loss	Per Cent of Total Property Loss
Explosives	132	6	1	1	0	$25,099	4.014
Acids and Corrosive Liquids	436	30	0	0	18	76,107	12.173
Inflammable Liquids	442	24	0	0	1	421,976	67,496
Inflammable Solids and Oxidizing Materials	104	99	0	0	0	73,939	11.827
Compressed Gases	38	3	0	0	1	22,593	3.614
Poisonous Liquids and Solids	16	0	0	0	0	5,475	.876
Totals	1,168	162	1	1	20	$625,189	
Totals 1944*	1,198	134	2	2	42	$785,746	
Totals 1943*	1,148	94	13	6	64	1,240,374	
Totals 1942	1,293	96	2	6	37	604,093	
Totals 1941	849	82	0	3	16	305.552	
Totals 1940	840	69	3	2	74	143,051	
Totals 1939	868	74	6	3	22	115.576	
Totals 1938	854	38	0	1	50	312.741	
Totals 1937	1,108	+	+	0	12	265.937	
Totals 1936	1,218	+	+	4	34	511,352	
Totals 1935	1,103	+	+	9	35	526,941	

* Corrected since last Annual Report.
\+ Not tabulated prior to 1938.

TABLE 4.

DISTRIBUTION OF PROPERTY LOSS (RAIL FREIGHT AND RAIL EXPRESS), ACCORDING TO PRINCIPAL CAUSES OF ACCIDENTS†, 1945

Classes	Negligence of Employe		Rough Handling		Improper Loading or Defective Container		Derailment or Collision		Spontaneous Heating or Excessive Sensitivity, etc.		Miscellaneous or Unknown	
	No. of Instances	Loss	No. of Instances	Loss	No. of Instances	Loss	No. of Instances	Loss	No. of Instances	Loss	No. of Instances	Loss
Explosives	11	$ 279	21	$ 442	83	$ 1,771	12	$12,696	2	$ 9,760*	3	$ 151
Acids and Corrosive Liquids	75	19.962	36	11,281	230	37.349	5	2,026	0	0	90	5,489
Inflammable Liquids	135	8,277	5	4,682	254	9,608	38	399,350	0	0	10	59
Inflammable Solids and Oxidizing Materials	15	686	8	5,792	28	23,293	0	0	43	38,092	10	6,076
Compressed Gases	25	453	0	0	10	439	2	1,540	0	0	1	20,161
Poisonous Liquids and Solids	4	3	0	0	12	5,472	0	0	0	0	0	0
	265	$29,660	70	$22,197	617	$77,932	57	$415,612	45	$47,852	114	$31,936

Total Number of Accidents.....1,168 Total Loss.....$625,189

* Spontaneous heating resulted from defective material.

NOTE: The available reports were apportioned among the above causes of accidents on the following basis:
Negligence of employes covering negligence on the part of any one having to do with the shipment, whether shipper or railroad employe.
Rough handling covers cases definitely so reported or in which bracing was broken down or lading badly shifted.
A charge was made against improper loading or defective container only where such reason for accident could be definitely inferred from the report. Collision do not include cases of cars being bumped together in switching, these cases being included under rough handling.
Under miscellaneous are included all not otherwise listed causes, such as hot loading, sparks, fire from adjacent property, etc.
† The term "accidents" includes leakage from containers, broken packages, etc.

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PLANT OPERATIONS NOTEBOOK

Automatic Control Terminology III

Publication of automatic control terms, as set forth by the American Society of Mechanical Engineers, began in the last issue and will be continued in this and ensuing issues. This list has been compiled by Donald P. Eckman of the Brown Instrument Company division of Minneapolis-Honeywell Regulator Co. and a member of the A. S. M. E. Terminology Committee of the Industrial Instruments and Regulators Division.—Editor.

400. Characteristics of Automatic Control

401 *Deviation* is the difference between the instantaneous value of the controlled variable and the value of the controlled variable corresponding with the desired value. (See Figs. 4 and 5.)

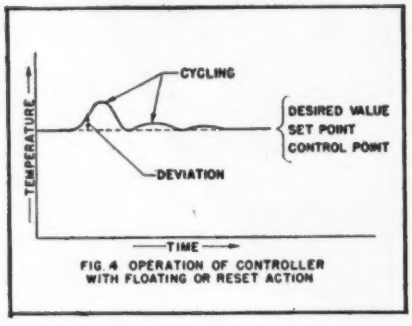


FIG. 4 OPERATION OF CONTROLLER WITH FLOATING OR RESET ACTION

402 *Offset* is a sustained deviation due to an inherent characteristic of positioning controller action, and is the difference existing at any time between the control point and the value of the controlled variable corresponding with the set point. (See Fig. 5.)

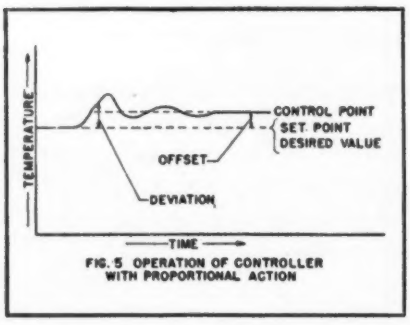


FIG. 5 OPERATION OF CONTROLLER WITH PROPORTIONAL ACTION

403 *Corrective Action* is predetermined variation of the manipulated variable initiated by a deviation.

404 *Cycling* is a periodic change of the controlled variable from one value to another. (*Oscillation* is a synonymous term.)

There are three types of cycling: cycling in which the amplitude gradually decreases, cycling in which the amplitude

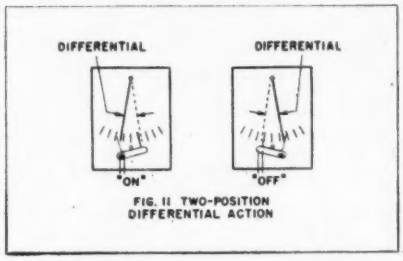


FIG. 11 TWO-POSITION DIFFERENTIAL ACTION

is constant, and cycling in which the amplitude gradually increases. (See Fig. 5.)

500. Types of Automatic Controller Action

For simplicity, the definitions which follow are stated in terms relating controller action to "position of a final control element." However, these defi-

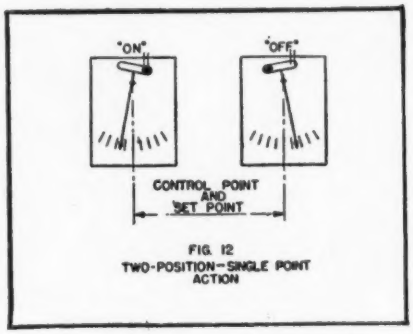


FIG. 12 TWO-POSITION—SINGLE POINT ACTION

nitions apply equally to equivalent controller action related to (1) "value of the manipulated variable," and (2) "value of set point of another controller."

For types of automatic controller actions which are defined as having a linear relation between a function of the controlled variable and position or rate of motion of the final control element, it is assumed that the linear relation may be referred to either "motion or force of the last element in the measuring means," as well as to "value of the controlled variable."

It is assumed that the automatic controller operates ideally, that is, it is capable of detecting infinitesimal variations of the controlled variable and responds instantaneously in accordance with its predetermined action.

501 *Positioning Action* is that in which there is a predetermined relation between value of the controlled variable and position of a final control element.

501a *Two-Position Action* is that in which a final control element is moved from one of the two fixed positions to the other. (Open and shut action, and On-Off action are synonymous terms.)

501aa *Two-Position Differential Gap Action* is that in which a final control element is moved from one of two fixed positions to the other when the controlled variable reaches a predetermined value from one direction, and subsequently is moved to the other position only after the variable has passed in the opposite direction through a range of values to a second predetermined value. (See Fig. 11.)

501ab *Two-Position Single Point Action* is that in which a final control element is moved from one of two fixed

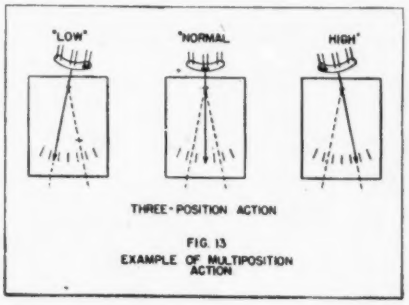


FIG. 13 EXAMPLE OF MULTIPOSITION ACTION

positions to the other at a single value of controlled variable.

The differential gap of this type of two-position action is zero. Such controller action may also be considered as proportional-position action in which the proportional band is zero, or floating action with zero neutral zone and with infinite floating speed. (See Fig. 12.)

501b *Multiposition Action* is that in which a final control element is moved to one of three or more predetermined positions, each corresponding to a definite range of values of the controlled variable. (See Fig. 13.)

501c *Proportional-Position Action* is that in which there is a continuous linear relation between value of the controlled variable and position of a final control element. (See Fig. 14.)

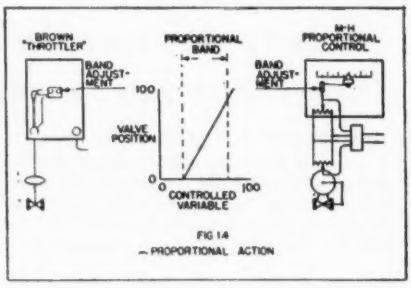
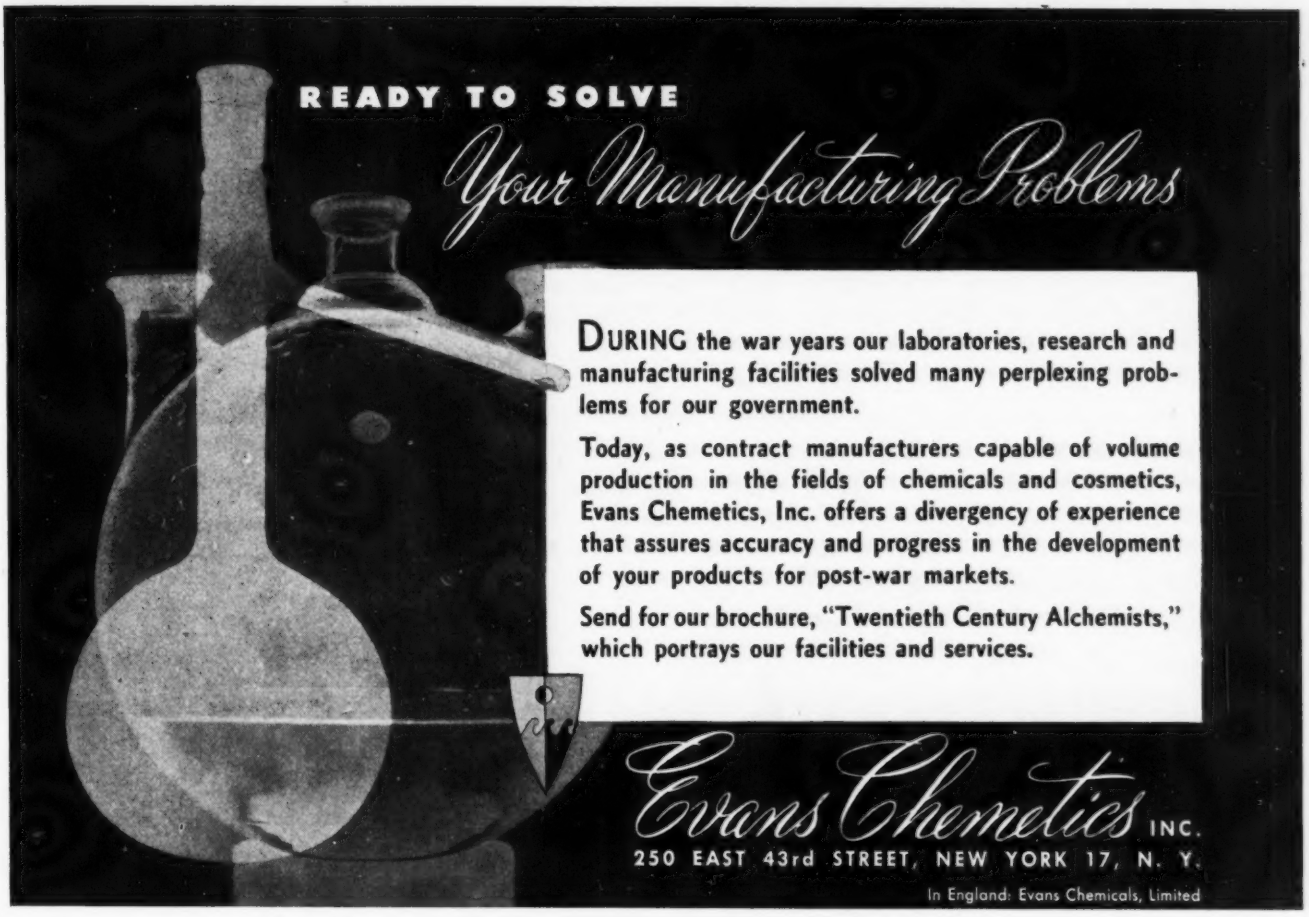


FIG. 14 —PROPORTIONAL ACTION

501d *Average-Position Action* is that in which there is a predetermined relation between value of the controlled variable and the time-average position of a final control element which is moved periodically from one of two fixed positions to the other.

This controller action is similar to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two-position action in which the percentage "time on" of the final control element is dependent upon the value of the controlled variable. The percentage "time on" may have either a fixed or infinite number of values to correspond to any

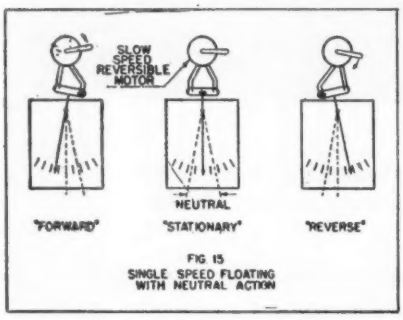

FIG 15
SINGLE SPEED FLOATING WITH NEUTRAL ACTION

one of the other positioning controller actions defined above.

502 *Integral Action* is that in which there is a predetermined relation between an integral function of the controlled variable and position of a final control element.

502a *Floating Action* is that in which there is a predetermined relation between value of the controlled variable and rate of motion of a final control element.

A neutral zone, in which no motion of the final control element occurs, is often employed in floating controller action.

502aa *Single Speed Floating Action* is that in which a final control element is moved at a single rate. (See Fig. 15.)

502ab *Multispeed Floating Action* is that in which a final control element is moved at two or more rates, each corresponding to definite range of values of the controlled variable.

502ac *Proportional Speed Floating Action* is that in which there is a continuous linear relation between value of the controlled variable and rate of motion of a final control element. (See Fig. 16.)

502ad *Floating Average-Position Action* is that in which there is a predetermined relation between value of the controlled variable and rate of change of the time-average position of a final control element wsich is moved periodically from one of two fixed positions to the other.

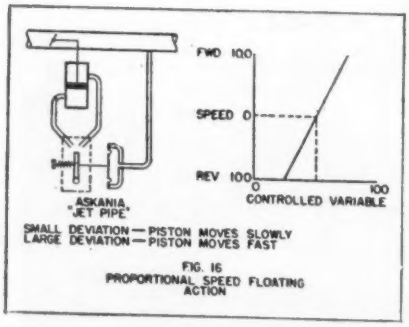

FIG. 16
PROPORTIONAL SPEED FLOATING ACTION

This controller action is similar to two-position action in which the percentage "time on" of the final control element is gradually changed at a rate dependent upon the value of the controlled variable. The rate of change of the percentage "time on" may have either a fixed or infinite number of values to correspond to any one of the other floating controller actions defined above.

503 *Derivative Action* is that in which there is a predetermined relation between a derivative function of the controlled variable and position of a final control element.

503a *Rate Action* is that in which there is a continuous linear relation between rate of change of the controlled variable and position of a final control element.

This controller action maintains a linear relation between first derivative or rate of change of the controlled variable and position of a final control element. This identical controller action may also be considered as maintaining a linear relation between second derivative or rate of the rate change of the controlled

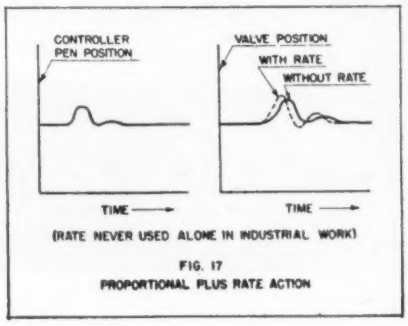

FIG. 17
PROPORTIONAL PLUS RATE ACTION

variable and rate of motion of the final control element. (See Fig. 17.)

504 *Multiple Action* is that in which

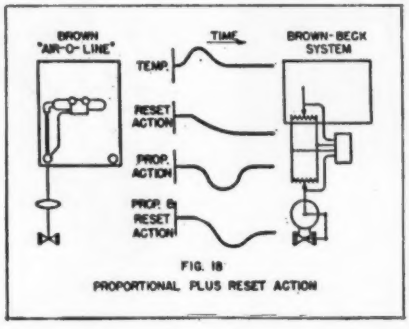

FIG. 18
PROPORTIONAL PLUS RESET ACTION

two or more controller actions are combined.

504a *Proportional plus Floating Action* is that in which proportional-position action and floating action are combined.

504aa *Proportional plus Reset Action* is that in which proportional-position action and proportional speed floating action are combined. (See Fig. 18.)

504b *Proportional plus Derivative Action* is that in which porportional-position action and derivative action are combined.

504c *Proportional plus Floating plus Derivative Action* is that in which proportional-position action, proportional speed floating action and derivative action are combined.

504ca *Proportional plus Reset plus Rate Action* is that in which proportional-position action, proportional speed floating action, and rate action are combined.

Eye Injury from Methyl Silicate

Methyl silicate may have a very damaging effect on the eye, according to reports from the laboratories of Carbide and Carbon Chemicals Corp. Exposure to methyl silicate vapors under certain humidity conditions, or to the liquid, may cause a necrosis of the corneal cells which progresses long after exposure, is destructive and resistant to treatment, and may lead to permanent blindness.

Ethyl silicate, on the other hand, has produced no serious damage to the eye, either as a vapor or when the eyelids of test animals have been filled with the undiluted liquid. The vapors may be toxic on inhalation, but widespread experience has shown no evidence that it may cause silicosis or other serious hazard.

Fire Extinguishers

Now that standard fire extinguishers are again available, it would be well to examine all Emergency Approved extinguishers for possible replacement. During the War years even priority holders often had to be satisfied with Emergency Approved extinguishers. The spirit in which emergency approval was adopted is indicated by the following statement from Underwriter's Laboratories, Inc.:

"National preparedness and defense, and now wartime controls of critical materials and methods, some of which may not be acceptable after Victory, their replacement becoming a necessary part of the cost of War."

The Inspection Department of the Associated Factory Mutual Fire Insurance Companies in its March, 1946 bulletin advised its members as follows:

"During the war and subsequent curtailment of critical materials, certain substandard fire protective equipment was manufactured as an emergency measure. Now, standard equipment is coming back on the market, and plants should call for devices with full Factory Mutual approval in making future purchases."

Standard extinguishers bear the Factory Mutual approval insignia (the letters "F.M." superimposed on a diamond-shaped design) and the Underwriters' Laboratories' label, which reads "Underwriters' Laboratories Inspected" and gives the serial number of the label and information regarding the classification of the extinguisher. The models made of substitute materials which meet the "Emergency Alternate Specifications" of the two laboratories bear the usual approval indications, the letters "EAS," and the year the equipment was manufactured.

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LABORATORY NOTEBOOK

Unitized Laboratory Furniture

Fisher Scientific Co. and Eimer & Amend have announced the availability of Unitized laboratory furniture. By selection from the twelve basic units, all carried in stock, an entire laboratory conforming to the desires of the buyer can be ordered by mail and set up on arrival by any "handy man" in a few hours.

The units are of standard height and depth and can be bolted together. Construction is of Kewaunee quality with steel construction and "Kemrock" impregnated stone tops. By the use of Kemrock cement the unit tops can be integrated into one piece.

The twelve units consists of drawers, sink, table, drawer-cupboard (two), cupboard, storage-dispensing (two), corner-cupboard, hood (two), wall case, floor case, and desk. Accessories include a desk chair, stool, and various fittings.

Glass Handling

Safe handling of glass apparatus in the laboratory is depicted in a new sound slidefilm entitled "Laboratory Glassware," just completed by the National Safety Council.

The film stresses the importance of doing each job the correct way, and provides step by step illustration of techniques that result in greater efficiency, as well as avoiding accident hazards.

Both industrial laboratory workers and school laboratory students will find the film helpful, the Council said.

An instructor's manual has been prepared by the Council as an aid to quizzes and group discussions following showings of the film. Further information may be obtained from the National Safety Council, 20 North Wacker Drive, Chicago 6, Ill.

CO_2 and O_2 Analysis

The Bacharach Industrial Instrument Company is now producing a duplex Fyrite test set, comprising two separate, portable indicators, one for direct carbon dioxide analysis, the other for direct oxygen analysis. The instruments are packed in a compact carrying case, together with aspirator and rubber hose for connecting either to the desired sampling point.

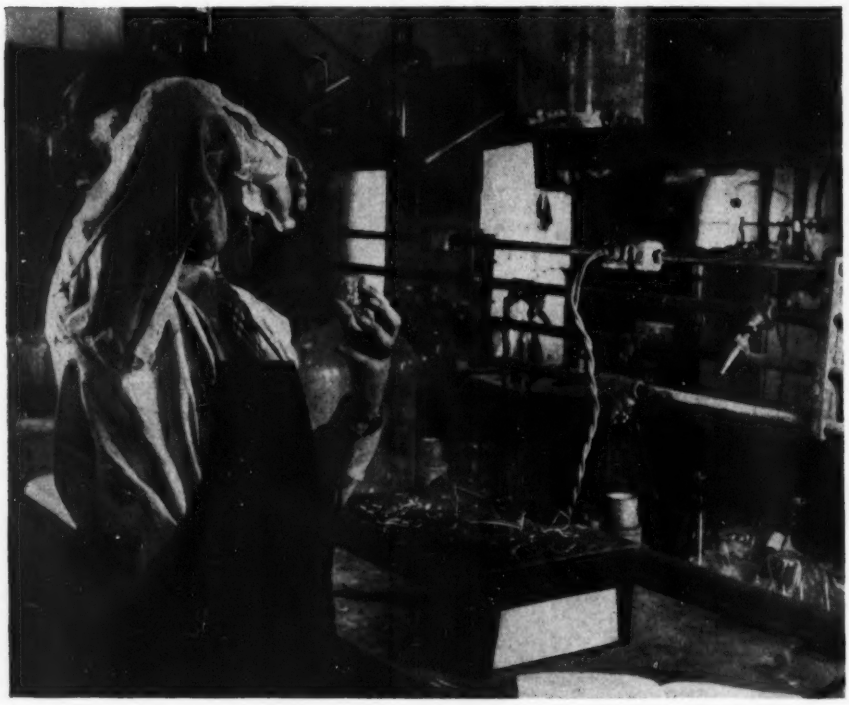
Both instruments employ the fundamental principle of chemical absorption and therefore give readings that are independent of voltage, humidity, temperature, or atmospheric pressure conditions. Operation of each indicator is identical.

A sample of the atmosphere or gas to be tested is pumped into the oxygen indicator by squeezing about a dozen times the aspirator which is attached to the rubber hose. The indicator is then turned bottom-side up and back again, causing the absorbing fluid to mix with the sample and pick up all the oxygen in the sample. Absorption of the oxygen creates a suction which draws the absorbing fluid up into the graduated tube in an amount equal to the oxygen absorbed. Thus the level of the fluid column shows the percentage of oxygen which can be read directly from the O_2 scale at the right side of the center tube.

Carbon dioxide tests are made by the same method, using the CO_2 indicator. The complete test with either instrument can be made in less than one minute, with an accuracy of within ½ of 1% O_2 or CO_2.

Major features of both instruments include simplicity of operation, convenience of use, ruggedness, proof against cold weather and spilling. The set is suitable for many field and shop tests including checking oxygen content in process gases, heat treating atmospheres, hydrogen cooled generators, and in the nitrogen over the oil in large transformers; measuring oxygen and carbon dioxide content of flue gases, storage atmospheres, etc.

Complete particulars are available in Leaflet 700-342 which can be obtained from Bacharach Industrial Instrument Company, 7000 Bennett Street, Pittsburgh 8, Penna.



The explosion of a distilling apparatus has taught this laboratory worker the hard way of the need for goggles and a safety shield between him and the apparatus. The scene is from the National Safety Council's new sound slidefilm, 'Laboratory Glassware'.

Temperature Regulator With Signal Light

A new mercury temperature regulator with a signal light, either red or white, which glows brilliantly while the temperature is rising and shuts off when setting temperature is reached, has been developed by the Washington Glass Laboratory and Instrument Company, 3224 Georgia Avenue, N. W. Washington 11, D. C. The signal light can be seen at a distance when glowing, permitting the operator to perform other duties. He can determine at a glance when the temperature in the bath, oven, etc., has reached setting temperature and when the regulator is operating properly.

The new regulator, called the Mercuroplat Thermo-regulator, is intended for accurate control of temperatures in water, oil, or air baths; ovens; etc., at any temperature within the setting range from minus 30°F. to plus 500°F. It has a sensitivity of plus or minus 0.02°F.

Contributing to this new temperature regulator's accuracy and long life is the manufacturer's improved distilling and filling method by which the mercury is distilled directly into the regulator without being exposed at any time to atmospheric air.

The instrument is fully described in manufacturer's Bulletin 100-26.

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Organic Reference Text

RICHTER'S ORGANIC CHEMISTRY — VOL. III. AROMATIC COMPOUNDS, *by A. J. Mee.* Elsevier Publishing Co., Inc., N. Y. 1946; 794 pp. $15.00. Reviewed by Herman A. Bruson, Rohm & Haas Co.

THIS BOOK corresponds to Volume II, Part 2 of the twelfth German edition published in 1935, with the exception of the section on organic free radicals which has been shifted to Volume IV. The collaborators of the present work include F. Arndt, A. Butenandt, F. Rochussen, R. Tschesche, and A. Weissburger with the cooperation of W. Baker, D. L. Haminick, E. Hope, J. C. Smith and T. W. J. Taylor.

Most organic chemists have used previous editions of "Richter" as a general reference text. The present volume should prove even more useful, since wherever possible, the references are given to the original journals and not to *Chemisches Zentralblatt.* Moreover the text has been considerably expanded over the last English edition. For example, more than a page of closely printed information is given on "perylene derivatives" instead of the six lines of the old edition. Welcome additions have also been made on topics such as thyroxin, phthalocyanin, pleidene, phthalacene, cyclopentenophenanthrene, pentacene, the Diels-Alder reactions and the general chemistry of the benzene ring. The book is clearly printed, very readable, and remarkably free from errors. One which the reviewer picked up is on page 697, where the melting point of 1,9-benzanthrone is incorrectly given as 75°, instead of 170°, and where the von Braun reference given deals with an entirely different material. On the whole, however, the work is excellent and should be in the library of every organic chemist.

Lectures on Polymers

ADVANCING FRONTS IN CHEMISTRY, VOL. I, "HIGH POLYMERS", *edited by Neil E. Gordon.* Reinhold Publishing Corp., N. Y., 1945. 195 pp. Price $4.00. Reviewed by C. E. Schildknecht.

THIS BOOK comprises a series of lectures sponsored by Wayne University, Detroit, Michigan, and presented at a Symposium on High Polymers in the spring of 1944. Typographical errors are much less in evidence than we have been accustomed to find in recent books on high polymers emanating from the New York area.

Although there have been some changes in emphasis and new strides in this field during the intervening two years, one can find here a fairly up-to-date resume of the principal ideas and theories relating the structure of high polymers to their physical properties which are prevalent in America. A lecture by R. Houwink in New York during the past winter left one with the impression that some different approaches to some of these problems are under way in Europe.

The book has to do primarily with vinyl polymers although cellulose derivatives, polyamides and several other types are discussed. Thermosetting phenolic and urea resins are not treated and perhaps wisely so. The topics and their authors are as follows: "Molecular Structure and Mechanical Behavior" (H. F. Mark); "Structure and Physical Properties" (S. S. Kistler); "Applications of Catalysis to Hydrocarbon Reactions" (E. C. Pitzer); "Mechanism of Addition Polymerization" (C. C. Price); "Free Radicals in Polymerization" (F. R. Mayo); "Molecular Size Distribution" (W. H. Stockmayer); "Chain Length and Physical Properties" (Emil Ott); "Nature of the Solid State of Chain Polymers" (W. O. Baker); "Concentrated Solutions of High Polymers" (J. D. Ferry); and "Textile Fibers" (Milton Harris).

A feature of this book is its portrait of each author together with a short bibliography preceding his chapter.

Appropriate to a vigorously growing branch of science, young men were selected to give these lectures. The average age is under 40. In spite of its incompleteness and the uneven quality of the different chapters, many interested in the physical chemistry of high polymers will want to add this volume to their libraries.

The reviewer had hoped that Mark, Baker or Harris would here clarify the confusion that exists over the use of the terms "crystallization" and "orientation" in high polymers. Harris especially uses these terms vaguely and interchangeably. Wayne University might note that Dr. A. F. Smith, of the Du Pont Laboratories at Wilmington, has given a lecture recently at the Polytechnic Institute of Brooklyn in which he carefully distinguished between the two phenomena as related to polyamides. The reviewer is informed that conservative X-ray men have been lamenting for some time the careless way in which many plastics people have been using these two words.

The material used by Pitzer in the Chapter on catalysis was not well chosen to interest polymer chemists; the reactions discussed are drawn primarily from the petroleum field. There is no mention of the catalytic dehydrogenation of ethylbenzene to styrene, nor of advances in catalysts for the preparation of vinyl chloride, acrylonitrile and vinyl esters directly form acetylene. Catalytic preparation of butadiene could have received considerable attention.

Ott has an interesting and informative discussion on the practical question "What are Plastics?" The book includes some clear writing and is quite concise, with perhaps the exception of Baker's chapter. The text of the latter borders on the poetic at times which is agreeable when not overdone. Baker's phrase "energetically soft methyl groups" is an experiment in word usage. Each author gives a list of references to the literature, of which Baker has 75 items.

Only the chapters by Mayo and Price treat chemical reactions of polymerization. It is unfortunate that more experimental work could not be reported of the quality that these men and their coworkers have carried out at Passaic and at Urbana.

Magnesium and Alloys

INTRODUCTION TO MAGNESIUM AND ITS ALLOYS, *by John Alico.* Ziff-Davis Publishing Company, Chicago and New York; 138 pp. Reviewed by Dale E. Zabel, Kansas State College.

THIS BOOK deals with magnesium and its alloys in all of the following phases—production, metallurgy, fabrication, heat treatment and uses. It should be of value to anyone interested in but not indoctrinated with the rudiments of the subject.

At first glance it might seem that the author could not give a very comprehensive presentation of the subject in 183 pages. This is not true. While some will not be able to find all the answers to their questions, this is not the purpose of the book. However, by using the information presented and the fine bibliography at the end of each chapter, an excellent knowledge of the subject can be gained.

In this publication will be found an explanation and evaluation of most processes used in refining metallic magnesium from its ores; metallurgical data; foundry practices, including permanent mold, die and sand castings; data on forging, rolling, forming and extruding of magnesium and its alloys. A brief but detailed coverage of heat treatment, surface treatment, machining principles, and joining methods, including riveting, torch welding, arc welding and spot welding, is given.

The coverage of such a broad subject in the short space allotted was accomplished by the use of a discerning selection of tables, flow sheets and plates.

While the reviewer would like to have had more space allotted to metallurgy and some to metallography, it would have tended to destroy the intent of the book which is, just as the name implies, an introduction.

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BOOKLETS & CATALOGS

Chemicals

A961. AMMONIUM SULPHATE. "Production of Ammonium Sulphate from Coke Oven Gas" titles a recent 8-page bulletin, available from the Wilputte Coke Oven Corp.

A962. CARBON BLACK. Seminex carbon black is the subject of a 4-page bulletin issued by the Jefferson Lake Sulphur Co.

A963. CHEMICALS. Exports price list. R. F. Revson Co.

A964. COATING MATERIAL. Prufcoat Laboratories has just issued an 11-page illustrated booklet describing the application of Prufcoat.

A965. DDT. The Pennsylvania Salt Mfg. Co. has published a 6-page color leaflet entitled "Confused about Insecticides".

A966. EMULSIFYING AGENT. "Iso-Beeswax", an emulsifying agent for creams, is the subject of an 8-page bulletin available from the Specialty Products Division of American Cyanamid & Chemical Corp.

A967. FURANS. "Introduction to the Chemistry of the Furans" titles a 16-page bulletin (No. 202) of the Chemical Department of The Quaker Oats Co.

A968. FURFURAL. Physical data on furfural is the subject of a recent 16-page booklet (No. 203) available from the Chemical Department of The Quaker Oats Co.

A969. KOROSEAL. "Koroseal—The Modern Flexible Material for Industry" titles an 18-page booklet of the B. F. Goodrich Co.

A970. MERCERIZATION. "Variations in the Removal of Pectic Substances from Cotton Yarn in the Mercerization Process" titles a recent bulletin issued by the Textile Chemical Division of the Dexter Chemical Corp.

A971. PLASTICS. The General Electric Co. has issued a 4-page folder describing the use of plastics in sealing caps and sleeves.

A972. PLASTICS. "Plastics Primer" titles an 18-page booklet of The Dow Chemical Co.

A973. SARAN. Technical data booklets on two new Saran coating materials—Saran F-120 and Saran F-122 are obtainable from the Plastics Division of the Dow Chemical Company.

Equipment

F745. AIR-COOLED HEAT EXCHANGER. "K-Fin Air-Cooled Sections Applied to the Fin-Fan Exchanger" titles an 8-page bulletin (No. 1230), which is available from The Griscom-Russell Co.

F746. ALLOY STEEL VALVES are the subjects of a recent 16-page booklet of Pioneer Alloy Products Co., Inc.

F747. BALL-BEARINGS. The Split Ballbearing Corp. has just issued a new 30-page catalog.

F748. BELTING. The Hewitt Rubber Division of Hewitt-Robins Inc. has just issued a new belting catalog.

F749. CATHODIC PROTECTION. A new 13-page booklet, dealing with use of magnesium anodes for cathodic protection has just been published by the Magnesium Division of The Dow Chemical Co.

F750. COKE OVEN. "Recent Improvements in Coke Oven Design and Operation" titles a recent 16-page bulletin, available from Wilputte Coke Oven Corp.

F751. COLORIMETER. The Lumetron photoelectric colorimeter (Model 450) is the subject of a recent 13-page bulletin issued by Photovolt Corp.

F752. CONDENSER INJECTOR. The Condenser Service & Engineering Co. has issued a 4-page bulletin describing the operation of the Wizard condenser injector for stopping tube leaks while the condenser continues to operate.

F753. CONDUCTIVITY CELLS are surveyed in a recent catalog issued by Industrial Instruments, Inc.

F754. CONICAL SCRUBBER. A 4-page bulletin (No. 37-A) has been issued by the Hardinge Co., describing their conical scrubber.

F755. COOLER. The Karbate sectional cascade cooler is the subject of a 4-page folder (No. M-8807A) of the National Carbon Co., Inc.

F756. DEFIBRATOR. The Asplund defibrator is the subject of a recent 16-page booklet of American Defibrator, Inc.

F757. DEW POINT INDICATOR. The Alnor precision dew point indicator, model 8, is pictured and described in a one-page leaflet (No. 4017) of the Illinois Testing Laboratories, Inc.

F758. DUST COLLECTION. The Claude B. Schneible Co. has issued a 4-page bulletin (No. 246) describing their new Velocitrap.

F759. ELECTRIC CONTROL. The various types of thermostats and pressure switches manufactured by United Electric Controls Co. are discussed in a recent catalog.

F760. FILTERS. Pressure leaf and cartridge type filters are discussed in an 8-page catalog of the Blackburn-Smith Mfg. Co., Inc.

F761. FILTRATION AND MIXING EQUIPMENT. The Alsop Engineering Corp. has just issued a 12-page catalog (No. 745) describing their Hy-Speed filtering and mixing equipment.

F762. FLASK LOADER. Robins Convey-

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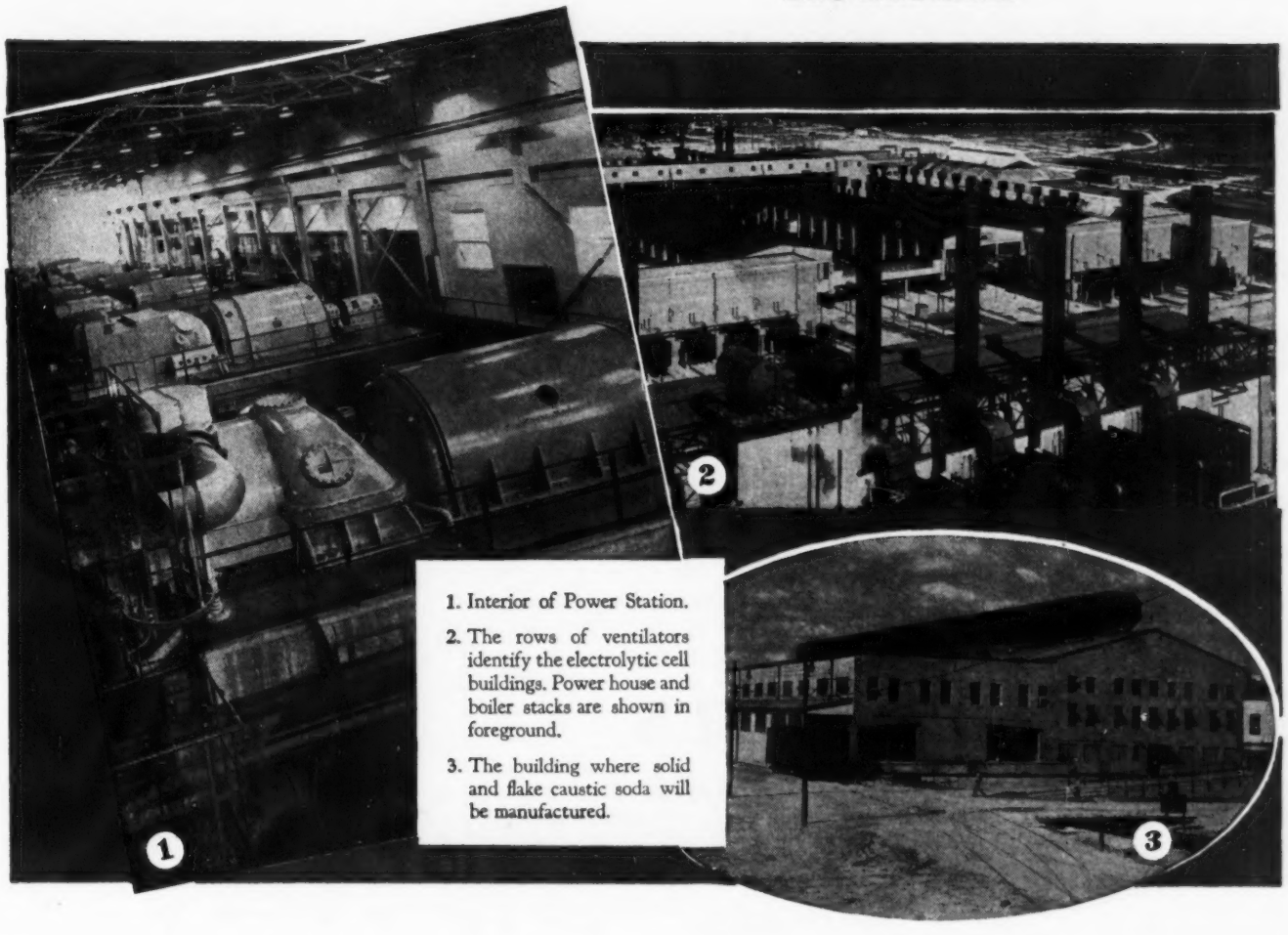

1. Interior of Power Station.
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3. The building where solid and flake caustic soda will be manufactured.

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ors, Inc. has issued a 4-page bulletin (No. 124-F) describing and illustrating the Robins portable Fioatex shakeout equipped with an automatic flask loader.

F763. Flooring. Emeri-Crete, a non-skid flooring, is the subject of a bulletin (No. 601) obtainable from Walter Maguire Co., Inc.

F764. Flow Indicator. A one-page leaflet (No. 360) is available from Builders-Providence, Inc., describing their new Flo-Gage.

F765. Foot Switches. The General Control Co. has just issued an 8-page catalog (No. 100) on their manually operated foot switches.

F766. Gas Masks. Mine Safety Appliances Co. has issued a 4-page bulletin describing and illustrating their line of industrial gas masks.

F767. Injection Molding Machine. The one-ounce injection molding machine is the subject of a new illustrated bulletin just released by Watson-Stillman Co.

F768.* Laboratory Services. "More Profits with Chemistry" titles a 20-page brochure published by Truesdail Laboratories, Inc. Inquiry must be on business letterhead.

F769. Lock Nut. The Gripco lock nut is described in a folder of Grip Nut Co.

F770. Metal Tube Inserts, Flowrites, are described and pictured in a recent 8-page bulletin of Condenser Service & Engineering Co., Inc.

F771. Motors. General Electric Company has issued an 8-page booklet describing their capacitor motors for jet-pump drive.

F772. Motor Starters. The type H line of motor starters is the subject of a recent bulletin (No.14B6410) of Allis Chalmers Mfg. Co.

F773. Nickel Alloy Equipment. The International Nickel Co., Inc. has issued a 44-page book listing suppliers of Inco nickel alloy parts and accessory equipment.

F774. Optical Pyrometer. A 6-page folder (No. 80) describing their optical pyrometer is available from The Pyrometer Instrument Co.

F775. Power Shears. The Cleveland Crane & Engineering Co. has issued an 8-page bulletin (No. 2011A) covering their steelweld pivoted-blade shears for metal cutting.

F776. Process Heating. The Blaw-Knox supertherm system of process heating, using superheated water, is the subject of a 12-page bulletin of the Power Piping Division of Blaw-Knox Co.

F777. Pumps. The Quimby Pump Division of H. K. Porter Co., Inc. has recently released a new bulletin on "Streamflow" Rotex pumps.

F778. Pyrometers. The Brown Instrument Co. has issued a buyers' guide and price list (No. 100-1) on standard pyrometer supplies.

F779. Relief Valve. Twenty basic designs of safety and relief valves are described and illustrated in a recent bulletin (#40) of the Farris Engineering Co.

F780. Refractory Concrete is the subject of a recent 24-page booklet, available from the Atlas Lumnite Cement Co.

F781. Sewage Treatment. "Pittchlor for Convenient Effective Chlorination in Sewage Treatment." titles a recent folder (No. A-704) available from the Columbia Chemical Division of the Pittsburgh Plate Glass Company.

F782. Sludge Blanket Type Reactivator is the subject of an 8-page booklet recently issued by Graver Tank & Mfg. Co., Inc.

F783. Spectroscopes. Spectroscopes of the Bunsen-Kirchhoff type are the subjects of a recent 4-page bulletin (No. 154-64) recently published by the Gaertner Scientific Corp.

F784. Spot Welding Machine. The Besco tweezer spot welding machine is the subject of a 4-page folder, available from Tweezer-Weld Corp.

F785. Time Controls. "Time Controls" titles a recent collection of reprints and data sheets, available from the Automatic Temperature Control Co., Inc.

F786. Timing Devices. Counting, timing and recording devices are the subjects of an 8-page catalog available from the O'Brien Steam Specialty Co.

F787. Water Heater. The O'Brien steam mixer water heater is the subject of a recent 4-page folder available from the O'Brien Steam Specialty Co.

F788. Water Strainer. A 4-page leaflet describing and picturing the Brassert self-cleaning water strainer is available from S. P. Kinney Engineers, Inc.

F789. Water Treatment. The functions and method of operations of the Consulting Division of W. H. and L. D. Betz are described in a recent booklet.

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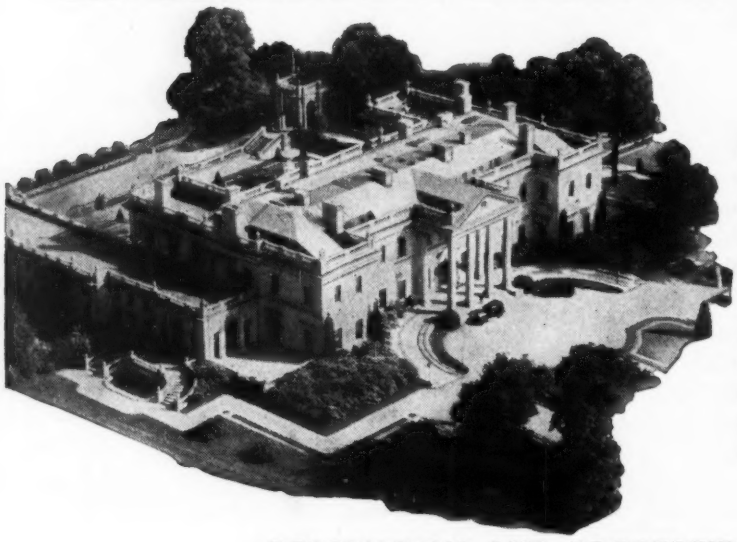

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NEWS OF THE MONTH

Alcohol Output Seriously Curtailed

FEW industries have been beset by more troubles during the past few years than have industrial alcohol producers. And, during the month, conditions became so serious that nine fermentation process plants in the Gulf and Eastern seaboard areas were forced to close down, as a result of raw material shortages. Too, even though some hope exists that Cuban molasses shipments may increase later this year, when the U. S. government completes purchasing arrangements, CPA is currently surveying the possibility of granting priority assistance for the construction of new facilities to be used for the manufacture of synthetic methanol and butanol, as well as ethanol from non-food raw materials such as sawdust and papermill wastes.

Seldom have fermentation alcohol producers been so hard hit, and the world food shortage renders their position far from enviable. For, so long as the food scarcity exists, agricultural products will be expensive—and alcohol production costs proportionate. With grain in short supply, molasses commands a premium as cattle food. Too, the Cuban government is utilizing substantial quantities of domestically distilled alcohol as motor fuel. All these factors stabilize the molasses market, and contribute to fermentation alcohol costs.

What are the prospects? Prior to the war, alcohol output averaged 100-125 million gallons per annum, about 70 per cent of which was derived from molasses and 7 per cent from grain. Some 25 companies made industrial ethyl alcohol, but five accounted for a little over 90 per cent of the total output.

Prices ranged from 17 cents to 53 cents a gallon—tied closely to molasses costs—and this vacillation in prices inhibited wide utilization of ethyl alcohol as a chemical raw material. Today, annual demand is placed at about 200 million gallons a year. Prices are high. Output barely approximates half the market need. An acute shortage is expected to obtain throughout 1946 and well into 1947.

But a feature of major significance is the growth of the synthetic alcohol industry. Founded in 1926, output grew slowly but steadily prior to the war, but in the past few years has risen to 65 million gallons per annum. Thereby, synthetic alcohol now has a far greater share of the market than it has ever enjoyed previously. Plans are under consideration for the expansion of present facilities, but actual completion of such extensions is not expected to materialize this year. Of substantial import is the fact that one fermentation processor, operating one of the world's largest units, has plans for an alcohol synthesis project on the drafting board. For, alcohol executives are not unaware of the history of methanol and acetic acid—synthetic vs. natural.

For the present, normal U. S. alcohol needs will have to be met largely by synthetic producers, and by withdrawals from the 55 million gallon government stockpile. Too, isopropyl alcohol, synthetic methanol, and acetone producers anticipate an augmented market demand for these solvents.

Heads General Mills Chemical Unit

Arthur P. Berry, named by General Mills Inc. to supervise construction and operation of the new plant which the company plans to build near Kankakee, Ill. for the manufacture of fatty acids.

Plan Early Dissolution of Farben

James S. Martin, director of U. S. efforts to break up German cartels, said recently that prospects are "hopeful" for speeding up dissolution of the giant I. G. Farben Industries and other outlawed German combines.

Representatives of the occupying powers hope to reach an agreement by September, according to Mr. Martin, on a final plan of liquidation of the Farben corporation which was credited with total assets of $2.8 billion.

The Allied Control Council has already directed seizure of the Farben assets, and current plans call for stripping the facilities to a state sufficient for peacetime economy only, with sale of surplus assets to independent groups.

Claim Vanadium Production Monopolized

A federal grand jury has returned an indictment charging six corporations, and five executive officers with conspiring to fix prices and monopolize the vanadium industry. The principal defendants named were Union Carbide & Carbon Corp. and Vanadium Corp. of America, who are alleged to control 99 per cent of all the vanadium oxide produced, sold, and consumed in the U. S. and 100 per cent of ferro-vanadium marketed.

E. D. Bransome, president of Vanadium Corp. of America has flatly denied such charges.

Nationalization of British Chemical Industry Mooted

Herbert Morrison, British cabinet minister, told a Labor Party conference at Bournemouth, England, June 10, that nationalization of the British chemical industry, and of fishing, petroleum and agriculture is actively before the National Executive Committee.

He said that plans were being formulated to bring all four industries into the party's platform for the 1950 general elections.

Wide Interest Evident in New Insecticide

Since its development in England a few years ago, the insecticide hexachlorocyclohexane—known more commonly as 666—has not aroused too much enthusiasm in the U. S. But, developments of the past few months indicate a sharp reversal in earlier thinking, with seven U. S. chemical concerns conducting pilot plant studies on its production. Of these seven concerns, several are planning larger production operations, and drafting marketing schedules.

Just where 666 will fit into the insecticide picture is still a controversial matter. As yet the Dept. of Agriculture will make no definite commitments or recommendations, based on the fact that but a limited amount of field testing has been completed. Some reports from the field have been excellent; some have been far from satisfactory. Until the worth of these experiments can be appraised, no too-inclusive statements can be made.

Several potentially promising fields of

application do appear on the horizon however. In the first place, 666 does kill a whole group of harmful insect pests unaffected by DDT, and over which there has been hitherto no single effective control. Some experiments have indicated that it may be a useful agent for the control of the cotton boll weevil, cotton aphids, and cattle grubs. Fruit and vegetable aphids, also appear susceptible to 666, as well as houseflies. Nevertheless although 666 does kill common houseflies rapidly, it does not have the same residual or lasting effect which makes DDT so valuable. Its odor, too, is regarded as being unfavorable for widespread household use.

The consensus at present is that 666 will become an insecticide of importance in the U. S. It will not compete with, but rather complement, DDT. However, its full field of usefulness will not be established this season, but by next year, it may be well on the road to tonnage output.

Baker Promoted by Kellex

A. L. Baker, who joined the M. W. Kellogg Co. in 1934, has been appointed vice-president of the affiliated Kellex Corp. He played a major role in the engineering of the plant to produce Uranium 235.

German Detergent Agent Described

A cellulose ether developed by the Germans for use as a washing agent by the textile industry is described in a report released by the Office of the Publication Board, Department of Commerce (PB-14527). The ether was known by the trade name "Tylose HBR."

The merit of the cellulose ether was that it prevented colloidal dirt from resettling on fabric after it had been removed by soaps. Its use permitted a 50 percent reduction in soap usage.

The ether was also used for sizing rayon, for waterproofing fabrics, and for thickening cotton printing solutions. A purified form of "Tylose" was used as an emulsifying agent and thickener in cosmetics, food stuffs, and ice cream.

CALENDAR *of* EVENTS

AMERICAN CHEMICAL SOCIETY, semi-annual meeting, Chicago, Sept. 9-13.
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, western convention, Palace Hotel, San Francisco, Aug. 25-28.
AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS will celebrate its 75th anniversary at the Waldorf-Astoria, New York, September 16-18, 1946.
NATIONAL CHEMICAL EXPOSITION will be held at the Chicago Coliseum, Sept. 10-14.
PAINT INDUSTRIES' SHOW, in conjunction with annual conventions of Federation of Paint and Varnish Production Clubs, and National Paint, Varnish and Lacquer Association, Hotel Claridge, Atlantic City, Nov. 4-6.
INSTRUMENTATION CONFERENCE and Exhibit, Hotel Wm. Penn, Pittsburgh, Sept. 16-20.

WAA Sells Carbon Black Plant

A South Eunice, N. Mex., plant intended for operation by Charles Eneu Johnson and Company in production of carbon black for the tire industry, but only 60 per cent complete at present, has been sold to the Johnson Company and Columbian Carbon Company for $750,000 cash on execution and delivery of valid title, according to War Assets Administration.

Potash Salts Under Allocation

Primary potash salts have been placed under complete allocation by the Civilian Production Administration, in a move to spread the short supplies of this material to meet the needs of the domestic fertilizer industry and other essential consumers. The allocation program is contained in schedule No. 120 to M-300.

It is estimated that the total supply of potash salts for the year will amount to about 800,000 tons, while the screened demand from all sources, exclusive of Japan's and other Far East consumers, from United States supplies approximates 900,000 tons.

Offer Catalyst Plant For Sale

A complete silica aluminum catalyst manufacturing plant with a rated capacity of 10,800 tons per year has been offered for sale or lease by the War Assets Administration. Situated in Cincinnati, Ohio, the plant was leased and operated during the war by the Diakel Corporation for the production of catalyst for use in fluid catalytic cracking units, the production being used largely in the manufacture of 100 octane aviation gasoline.

Nitrogen Use Declines

Total consumption of nitrogen in the immediate future is expected to be considerably less than that reached during the war, the Bureau of Mines reports.

Industrial consumption, which reached its peak in 1943-44 and decreased slightly in 1944-45, may decline considerably further under unfavorable industrial conditions, according to the bureau's report. Munitions requirements are expected to be relatively small, but because of the world-wide food shortage the demand for fertilizer nitrogen will probably continue at a high level for a year or two.

The United States has a domestic nitrogen capacity of 1,500,000 to 1,700,000 short tons of nitrogen annually, which combined with imports of 200,000 to 300,000 tons could make available supplies of 1,750,000 to 2,000,000 tons of nitrogen per year.

This capacity is more than double prewar domestic consumption, and far in excess of present needs, which the most favorable estimates place at less than 1,200,000 tons. The domestic plant capacity is enough to make the United States more than self-sufficient in nitrogen except where cyanamide from Canada and natural nitrates from Chile are specifically demanded.

Details of Mercury Cell Revealed

A horizontal mercury-type chlorine cell which produces caustic soda of 50 per cent concentration without further processing has been discovered by American investigators in an I. G. Farben plant. This 7 meter cell is now en route to the U. S. and will be placed on exhibition at Edgewood Arsenal, Md. next month.

One of the main features of the cell is that it yields caustic soda of rayon grade directly. Most U. S. cells turn out 12 per cent caustic soda which must be concentrated by evaporation to the standard 50 per cent strength.

Plans Synthetic Gasoline Unit

Stanolind Oil and Gas Co. is currently considering the desirability of constructing a plant for the preparation of gasoline and other hydrocarbons from natural gas via the Synthol Process. Presumably this plant would be the latest version of the Synthol Process announced by the M. W. Kellogg Co. about one year ago (CHEMICAL INDUSTRIES, Vol. 56, pg. 783, May, 1945), and, according to Stanolind, is based on research and pilot plant operations which have been carried on at Tulsa for several years.

The proposed plant would be built in Kansas and would utilize gas from the Hugoton field, although the exact location is still problematical.

This plant is the second unit to be projected for the United States which is based on synthesis of hydrocarbons from a mixture of carbon monoxide and hydrogen prepared from natural gas. The first is that of Carthage Hydrocol, Inc. (see pg. 58), on which ground has been broken near Brownsville, Texas.

Present estimates are that the plant may utilize as much as 100,000,000 cu. ft. of natural gas per day to produce 6000 bar-

rels of gasoline and 1000 barrels of distillate fuels per day. The Brownsville plant is reported to produce 5800 barrels of gasoline, 1200 barrels of Diesel oil and 150,000 pounds of oxygenated products (mostly alcohols) per day from 64,000,000 cubic feet of natural gas (see pg 58).

Old Ocean Oil Acquires Abercrombie

The Old Ocean Oil Co. has acquired the J. S. Abercrombie Co., Houston, Texas, for a cash consideration in excess of $50,000,000. A substantial issue of 20-year debentures, placed with Stanolind Oil and Gas Co., and borrowing from New York banks provided the finances. J. S. Abercrombie Co., with the La Gloria Corp. and Socony-Vacuum Oil Co., financed the development of the Hydrocol process which is described in this issue.

WAA Offers Furfural Facilities

A Memphis, Tenn., plant formerly operated by the Q.O. Chemical Company has been declared surplus and is being offered for sale or lease by War Assets Administration. This unit was designed to produce furfural in connection with the wartime synthetic rubber program and has a rated capacity of 24,000,000 lbs. per year.

It will be disposed of subject to the requirements of the Office of Rubber Reserve, Reconstruction Finance Corporation.

Streptomycin Prospects Improve

With April production of streptomycin at a new peak of 36,982 grams—an increase of 10,642 grams over March—the Civilian Production Administration feels that limited commercial distribution of the antiobiotic may be possible in the near future. Although raw material supplies complicate the outlook, it is hoped that government action may permit allocations of raw materials sufficient to sustain production schedules.

If conditions permit, it is possible that initial distribution to a selected number of hospitals will be effected by August. The hospitals receiving the drug will act as depots in their areas, in the same method as was used in the early days of penicillin. Too, the acceptance of streptomycin by a hospital is to be conditioned by its agreement to observe the recommendations of the Research Council Report insofar as possible.

Appraise Nickel Salts Potentialities

As a result of research investigations conducted during the past year, the Mellon Institute states that it has been found that several nickel compounds hold industrial promise.

Specificially, nickel arsenate and nickel ethylene bisdithio-carbonate show possibilities as effective insecticides, and nickel arsenate, naphthenate and sulfate have yielded interesting results in long-term wood preservation tests. Other complex compounds appear to be suitable for lubricant and motor oil additives, as catasts, and rubber accelerators.

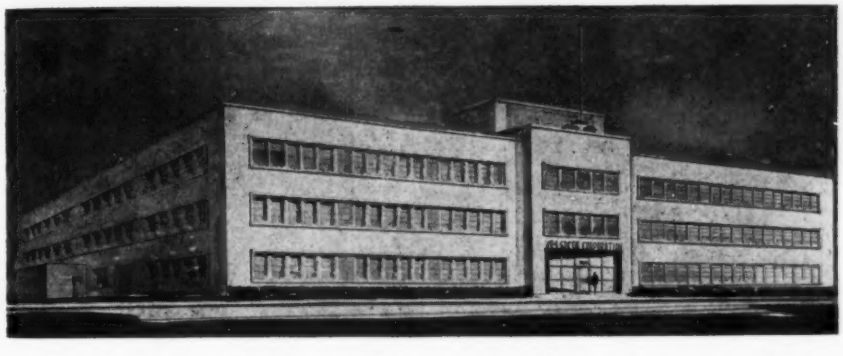
New Technique for DDT Analysis

A technique for the rapid analysis of DDT, so that its insecticidal efficiency may be evaluated, has been evolved by du Pont in cooperation with OSRD. Employing the infra-red spectograph, the analytical procedure requires only about thirty minutes to complete.

Commercial DDT consists mainly of three isomers, but the most effective isomeric constituent is known technically as 1,1,1-trichloro-2,2-bis (p-chlorophenyl) ethane.

By the spectographic method the proportion of various isomers in any particular lot of DDT may be determined, and thereby its insecticidal value appraised.

New Velsicol Laboratory



Architect's drawing of office and laboratory building under construction for the Velsicol Corp., Chicago. Completely air-conditioned, it will include chemical, entomological, and instrumentation laboratories as well as pilot plant facilities.

Monsanto Men Awarded Academic Leaves

Monsanto Chemical Company has named four industrial scientists who will be awarded leaves of absence at full salary for an academic year of study at universities of their choice.

Announcement of the awards inaugurated a program, a new move in American industry, to enable scientists to renew their studies and to establish close cooperation between industry and the university laboratory.

Named to receive the awards were Louis P. Wenzell, Jr., St. Louis, Mo.; Colver P. Dyer; Carlyle John Stehman, Dayton, O., and Eli Perry of Springfield, Mass.

Diamond Advances Robinson

E. A. Robinson, named technical assistant to the director of sales, Diamond Alkali Co. During the war he was technical director of Diakel Corp., a cooperative Diamond - M. W. Kellogg project.

Minerals Yearbook Released

The 1944 edition of the Minerals Yearbook, authoritative publication on domestic and foreign mineral commodities is now available for public distribution.

Bound copies of the Yearbook may be obtained for $3 each from the Superintendent of Documents, U. S. Govt. Printing Office, Washington 25. Separate chapters are also obtainable at prices ranging from 5 to 15 cents.

Record Potash Output For Year

The Bureau of Mines, United States Department of the Interior, reports that more new records were made in 1945 in the potash industry of the United States, new highs being reached both in the production of marketable potassium salts and in sales. In 1945, 1,588,305 short tons of potassium salts containing 874,243 tons of equivalent potash were produced. A slightly larger quantity (1,597,160 tons),

also a record, was sold; this material contained 870,370 tons of equivalent potash.

Stocks of potassium salts in producers' hands at the end of 1945 were a little less than in 1944, but in terms of contained K_2O are reported to have been larger than in any recent year. Exports of fertilizer potash materials were less in 1945 than in 1944 but those for chemical uses were somewhat larger. Imports of potash materials for fertilizer purposes in 1945 were about half those in 1944, whereas those for chemical use were about double the imports for that use in 1944. Domestic consumption of potash again made a new high record—this time exceeding 800,000 short tons.

Lecithin Makers Face Trust Charges

A suit charging violation of the anti-trust laws has been filed against three American makers and one sales agency for lecithin, a soy bean extract, it is announced by United States Attorney Don C. Miller.

The defendants are the American Lecithin Co., New York; the Glidden Co., Cleveland, and Archer-Daniels-Midland Co. of Minneapolis, identified as manufacturers of the product, and Ross & Rowe, New York, a sales agency.

The suit charges the defendants pooled products and patents and set prices unlawfully, and asks that their agreements be canceled.

The three manufacturers produce about two-thirds of the domestic output of lecithin, used as an extender and preserver in many food products and in textiles, paints and other commodities, the suit asserted.

Chemicals Wanted

The following chemicals are wanted by the National Registry of Rare Chemicals, Armour Research Foundation, 33 Federal and Dearborn Sts., Chicago, 16:

Bismuth tetroxide
Cupric borate
Stannous acetate and tartrate
Azulene
Erythrulose
Formoguanamine
Silicon monosulphide
Silicon disulphide
Methacrylic anhydride
Vinyl chloracetate
Silicon trichloride
o-Toluene sulfonyl chloride (250-500# per month)
1,2-Naphthylene diisocyanate
Polyethylene glycol chlorohydrins of molecular weight 200-400
Alkyl chlorohydrins of molecular weight 200-400
3-Isopropylphenol
3-n-Propylphenol
Carbamyl chloride
Eriodictyol
Ferrous thiosulfate
Dioleyl maleate

Sale of Synthetic Rubber Units Proposed

Early disposal of 10 specialized plants used in the wartime synthetic rubber program was proposed in a report submitted to Congress by the War Assets Administration. Aggregate government investment in the plants was $182,000,000.

The plants represent more than one fourth of government synthetic rubber plants costing more than $5,000,000 and also more than one fourth of the total government investment in such plants. They represent the entire butyl rubber capacity of the country, more than 90 per cent of the styrene capacity, 86 per cent of the neoprene, 68 per cent of furfural and eight per cent of carbon black.

Briefly, WAA proposed the following disposal steps. The plants will be offered immediately and their availability given wide publicity; preliminary negotitations will be carried on with potential purchasers or lessees after which a cut-off date for bids for plants in each category will be set; efforts will be made to sell the plants, but if offers are unacceptable, leases will be considered; the owning agency when necessary will prescribe conditions for disposal to insure an adequate supply of synthetic rubber while natural rubber remains scarce; special attention will be given to offers which afford prospect of introducing competition in the fields of neoprene, butyl and furfural production; the Office of Rubber Reserve will be asked to advise or assist prospective purchasers or lessees in acquiring patent rights.

Plants covered by the report, with approximate cost in millions of dollars bracketed, are: butyl, Standard Oil Co. of N. J., Baton Rouge, ($25.9); Humble Oil and Refining Co., Baytown Texas ($25.9); neoprene, E. I. du Pont de Nemours, Louisville, Ky. ($38.4); styrene, Carbide and Carbon Chemical, Institute, W. Va., (9.8); Dow Chemical, Los Angeles, ($12.6); Dow Chemical, Velasco, Texas, ($17.8); Koppers Co., Kobuta, Pa., ($18.8); Monsanto Chemical, Texas City, ($18.3); furfural, Q. O. Chemical Co., Memphis, Tenn., ($5.0); carbon black, United Carbon Co., Odessa, Texas, ($9.5).

COMPANIES

Carbide Plant Sold by WAA

The Electro Metallurgical Company, New York, N. Y., has purchased for $5,050,000, the ferro-silicon and calcium carbide plant it operated during the war at Ashtabula, Ohio, War Assets Administration has announced. WAA reported that the property which was built and equipped by the Federal Government at a cost of $8,353,634, has a present-day fair value of $4,616,501 and was bought by Electro Metallurgical Company for 98 percent of this fair value, or $4,530,000, the remaining $520,000 of the purchasing figure covering plant inventories which were bought at 80 percent of their book value.

The sale, which was negotiated by WAA and is subject to the Surplus Property Act and the applicable regulations issued thereunder, will result in immediate reconditioning of the plant furnaces by Electro Metallurgical, which now occupies the facility but is not operating it. The purchaser proposes to resume calcium carbide production as soon as the furnace alterations are completed, and to expend $9,000,000 for the installation of a power plant and a dust and fumes control system.

Visitors Study Corrosion Problems

P. Hamer and S. Stevens (right), Imperial Chemical Industries, examine new corrosion-testing apparatus in the Hall Laboratories, Pittsburgh. E. P. Partridge of the ASTM's committee D-19 points out its features, while R. E. Hall looks on.

Diamond Builds Texas Caustic Unit

Diamond Alkali Company has received the approval of the Civilian Production Administration to construct a $5,750,000 electro-chemical plant at Houston, Texas, for the manufacture of chlorine, caustic soda and muriatic acid, according to John T. Richards, Diamond president.

Construction at the newly-purchased 280-acre plant site wil begin in about 60 days. The new plant will include eight buildings, covering about 40 acres. The bulidings will be constructed of steel with cement asbestos roofing and siding. Normal conditions would require 18 months for completion of the project, but present day delivery conditions may alter these plans.

In discussing the new Houston plant, Mr. Richards said, "The executives of Diamond Alkali are enthusiastic about the industrial potentialities and record of the Gulf Southwest and believe this new plant will eventually become a very large chemical plant based on the abundant resources and other advantages offered by Texas."

Kidde Buys Unit from WAA

One complete plant and part of a second, both in Belleville, N. J., were sold to the wartime operator, Walter Kidde and Co., for $1,800,000, War Assets Administration has announced.

Sale of the Kidde plant which was used during the war for the production of high-pressure gas cylinders, covers land, buildings and certain items of machinery to be selected by the Kidde Company within the next 30 days. These items will be paid for separately.

The offer resulted from a negotiated bid and represents 91 per cent of the present-day fair value of the two properties.

Standard Chemical Purchased by Nuveen

Standard Chemical Company, of Des Moines, Iowa, manufacturers of pharmaceuticals and physicians' supplies since 1905, has been acquired by John Nuveen & Company, New York investment house. Associated in the new ownership of the company is Charles M. Baker, of Chicago, an executive of Armour & Company for the past nineteen years, who has been elected president and a director of the new corporation.

Warner Crusinberry, of Des Moines, operating manager of Standard Chemical, has been elected vice-president of the new company, and Arthur F. Goeing, of Chicago, secretary-treasurer. Mr. Crusinberry has been associated with Standard Chemical for the past twenty-five years. Mr. Goeing has been an analyst, accountant and statistician with John Nuveen & Company.

With the change in ownership, plans are already under way to enlarge substantially the production facilities of the company, according to Mr. Baker.

Heads Spencer Chemical

Kenneth A. Spencer, president of the recently organized Spencer Chemical Co., formed to operate the former Jayhawk Ordnance Works for the production of ammonium nitrate and kindred chemicals.

Spencer Chemical Buys Ordnance Works

The Jayhawk Ordnance Works, near Pittsburg, Kansas, built and operated under a prime contract with the Military Chemical Works, Inc., a wholly-owned subsidiary of The Pittsburg and Midway Coal Mining Co., has been acquired by the Spencer Chemical Co.

With production capacity in excess of 300 tons per day of anhydrous ammonia and an equal quantity of ammonium nitrate solution, the unit will continue to function with major emphasis placed on the manufacture of nitrogenous fertilizer. In addition, Spencer contemplates output of methanol, liquid and solid carbon dioxide, and nitric acid.

The fertilizer ammonium nitrate will be distributed by the company in carload lots through established channels, for domestic and export sales, and a sales organization will be maintained at Kansas City, Mo.

Financed by The Pittsburg and Midway Coal Mining Co. and J. H. Whitney & Co., New York, the new concern will be headed by Kenneth A. Spencer, president, with Joe E. Culpepper as sales director.

Shell Ups Isopropyl Capacity

Shell Chemical Corp. plans large scale production of glycerin epichlorhydrin and isopropyl alcohol at the $3 million unit it is now constructing at Houston, Texas.

It is estimated that the new facilities will increase Shell's output of isopropyl alcohol by about 100 million pounds per annum.

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Now in commercial production for the first time.

Our Research group is now engaged in evaluating the chemical and physical properties of this new product.

Meanwhile, LITHIUM MANGANITE is already finding use as flux material in enamels.

Should you have an experimental interest in this new product we will be glad to furnish samples.

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International Minerals Acquires Gluten Interest

To assure a continuing supply of necessary raw materials for its amino products division, International Minerals & Chemical Corporation has acquired one-half interest as well as contracting for the entire output of wheat gluten of the recently formed Wheat Products Company of Jefferson City, Missouri.

According to Louis Ware, president of International, the new company has already started the construction of a plant in Jefferson City at an estimated cost of $1,000,000 which is expected to be ready for operation in the fall. The company will produce gluten to be used by International at its amino products plant in Rossford, Ohio, for the manufacture of mono sodium glutamate which is sold mainly as a flavor accentuator for the food industry.

Publicker Buys Philadelphia Facilities

Four Philadelphia, Pa., war plants, operated by Publicker Industries, Inc., during the war, have been sold in part to the operating lessee for $4,500,000, the War Assets Administration reports.

Used during the war for converting molasses to ethyl alcohol and to recover feed values of liquid residues from alcohol production, the plants now will be operated in connection with the purchaser's privately-owned plants in producing ethyl alcohol and in the recovery of feed values from grain or surplus agricultural commodities.

Alumina Plant on Auction Block

Offers to purchase or lease a government-owned alumina reclamation plant near East St. Louis, Ill., have been invited by the War Assets Administration. Leased and operated during the war by the Aluminum Ore Co., the plant has a reported cost of $12,614,242.

WAA is requesting proposals to purchase or lease the facility for continued operation at the present site; purchase buildings for conversion to other than the original use; and purchase equipment for dismantling and removal to other locations.

Metalsalts Founds Subsidiary

Dar Syn Laboratories Inc. has recently been formed as an affiliate of Metalsalts Corp. for the manufacture of fine organics. At present, according to William M. Stieh, president, the new organization is manufacturing 8-hydroxy quinoline at Paterson, N. J. but, as soon as building conditions permit, operations will be transferred to facilities to be completed at Hawthorne, N. J.

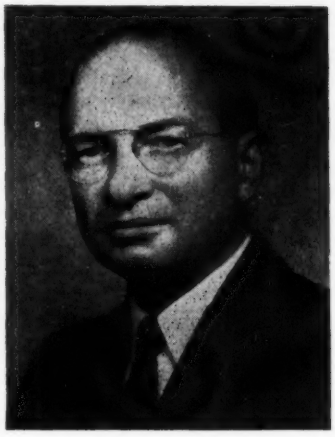
The Metalsalts group now consists of three companies, and future plans call for a consolidation of all research and development of new products under the direction of Robert O. Weiss.

Airco-U. S. I. Plan New Research Unit

Air Reduction Co. and U. S. Industrial Chemicals Inc. plan the construction of a new research laboratory on a recently acquired 40-acre site at Stamford, Conn. The new facilities will accommodate the 200 technical employees constituting the chemical research staff of the two organizations.

The laboratories will have a floor area of 100,000 square feet. The separate laboratories of Air Reduction and U. S. I. will occupy the two main wings, with a smaller wing housing equipment for pilot plant studies.

Hildebrand Joins Calco



E. J. Hildebrand, associated with the Glidden Co. for twenty-four years, has joined Cyanamid's Calco Division as an assistant sales manager in the Pigment Dept.

Chemical Construction Builds Pilot Plant

Chemical Construction Corp. is embarking on a peacetime program of research designed to expand the scope of its operations to the world chemical industry, Frederick Pope, president, announced recently.

The company, a unit of American Cyanamid Co., is building a new pilot plant at Linden, N. J., where it will conduct experimental work to augment chemical processes on which it already holds numerous patents, and also engage in research and development of new processes.

Cadet Chemical Begins Peroxide Manufacture

Cadet Chemical Corp., Buffalo, has brought in a unit for the commercial production of benzoyl peroxide, according to A. A. Wahl, vice-president.

Major fields of application of the peroxide are as a catalyst in the polymeriza-

tion of methyl methacrylate, vinyl type monomers and styrene, as a bleaching agent for oils, fats, and waxes, a drying agent for unsaturated oils, a raw material for organic syntheses, and a burn-out agent for acetate yarns.

Chemurgic Corporation to Buy War Plant

The War Assets Administration has reported the sale of the chemical warfare plant in Turlock, Cal., which was leased and operated by the Day & Night Flare Corporation during the war, to the Chemurgic Corporation, which plans to manufacture plastics. The plant was sold for $162,500.

Plan Closing of Two Refineries

Wartime technological developments in petroleum refining have forced the Standard Oil Co. (Indiana) to a decision to close its refineries at Neodesha, Kan., and Graybull, Wyo. The units will be shut down in 1948.

The installation of catalytic equipment during the war has developed a competitive situation which would require that such processes be installed at these refineries, as well as at Sugar Creek, Mo. and the Casper refinery. In that such duplication would not be economically sound, the last mentioned refineries only, will be re-equipped.

Penn Salt Builds Western Unit

The Pennsylvania Salt Mfg. Co. of Washington has begun construction of a $1 million plant on the Williamette River, near Portland, Ore. Initial operation is scheduled for June, 1947.

The new unit will produce liquid chlorine, caustic soda, sodium chlorate, potassium chlorate and sodium hypochlorite.

General Buys Sulphuric Unit

General Chemical Company, New York, N. Y., has purchased the Front Royal, Va., plant it operated during the war in producing 160,000 tons of sulphuric acid per year for the rayon tire cord industry.

The negotiated bid was for $1,386,000 cash. General Chemical Company will continue sulphuric acid manufacture, employing about 50 persons.

New Plant for Alcoa

Aluminum Company of America plans construction of a large new plant near Davenport, Iowa, for the rolling of aluminum sheet and plate. The unit, which is to cost more than $30,000,000, will have the capacity to produce more than ten million pounds of sheet and plate per month when placed in operation.

Construction is scheduled to begin as soon as the project has been approved by the Civilian Production Administration, and completion of the plant will require approximately 18 months.

Monsanto Considers Stock Increase

Directors of Monsanto Chemical Co. have called a special stockholders meeting for July 23 to vote on increasing the authorized common stock from 2 million shares of $10 par value to 6 million shares of $5 par value.

It is proposed to issue three shares of the new common stock for each of the 1,267,868 shares of outstanding common, $10 par.

Bakelite Expands Vinyl Facilities

Bakelite Corp., unit of Union Carbide & Carbon Corp., announces the acquisition of the former Inland Rubber Co.'s plant site, near Ottawa, Ill.

"Construction of the manufacturing building will be completed as quickly as possible," says H. S. Bunn, vice president. "It is hoped that the plant will be in operation by the first quarter of next year," he states.

The new plant will manufacture vinylene calendered film and vinylite press-polished rigid sheets.

This production will supplement the facilities of Bakelite Corp.'s main plant at Bound Brook, N. J.

Heads Chemists Convention

Fred C. Koch, director of biochemical research at the Armour Laboratories, named general chairman of the ACS' 110th national meeting to be held in Chicago Sept. 9-13.

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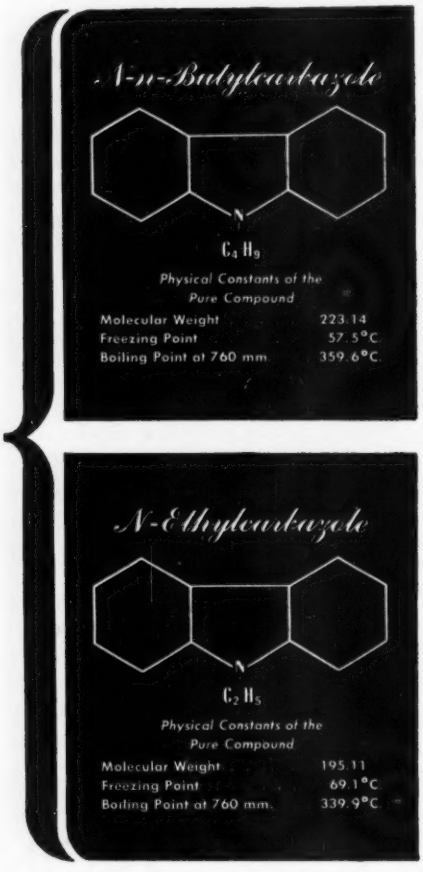

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★ 17 PLANTS To Serve the Nation

ICI Expands Dyestuff Output

Imperial Chemical Industries Ltd., London plans a $36 million expansion of its dyestuffs division, which will add 2000 to its staff to double 1939 employment of this division.

The program is designed to permit ICI to obtain a heavy share of the chemical export trade formerly dominated by Germany.

Cement Companies Merge

The Atlas Lumnite Cement Company has been merged into the Universal Atlas Cement Company, according to an announcement by the latter company. Both companies are wholly-owned subsidiaries of the United States Steel Corporation.

The organization of the former Atlas Lumnite Cement Company will be known as Lumnite Division, Universal Atlas Cement Co. The manufacture and sale of Lumnite, a special hydraulic cement used for industrial purposes, will be continued under the direction of Joshua L. Miner, vice president, Lumnite Division.

International Minerals Plans Stock Sale

International Minerals & Chemical Corporation has filed with the Securities & Exchange Commission a registration statement covering 145,834 shares of its common stock, $5 par value, sale of which has been approved by stockholders.

Bring in Sulfur Wells

Initial sulfur production from the Long Point Dome properties of the Jefferson Lake Sulfur Co., in Fort Bend County, Texas, has been realized according to Charles J. Ferry, secretary.

Steaming of the two wells, now producing, began June 1, with additional wells scheduled to come in shortly. Company officers place property reserves at ten years.

Du Pont Centralizes Nylon Chemical Research

A Nylon Section has been established in the Chemical Division of the Du Pont Company's Ammonia Department to centralize all the department's research and development work on chemicals used in making nylon.

Nylon intermediates are manufactured by the Ammonia Department and sent to plants of Du Pont Rayon and Plastics Departments for further processing into textile fibers, monofilaments, and molding powder.

E. C. Kirkpatrick is director of the new Nylon Section and A. G. Weber, who has been director of the Ammonia Department laboratory, now heads the General Section. Both have headquarters at the Du Pont Experimental Station.

Company Notes

Shell Union Corp. has recently allocated $10 million to SHELL CHEMICAL CORP. for the construction of new production facilities.

Headquarters of the Special Chemicals Division, WINTHROP CHEMICAL CO. INC., have been moved from Renesselaer, New York, to the main offices at 170 Varick St., New York 13, N. Y.

CIBA CHEMICAL LABORATORIES, INC., New York, has purchased a 147-acre plant site near Valley Forge, Pa., for $165,825. Unofficially, it is reported that the company will construct a $1 million chemical unit at this location.

Officials of B. F. GOODRICH CO., state that the company is not planning construction of a plant in Mexico, as was reported in this column last month. We regret the publication of this item, which was based on information regarded as reliable at the time.

THE COLLETT CORP., Ossining, N. Y., manufacturers of vitamin concentrates, has merged with Technical Fisheries Corp., San Francisco, fish-liver collectors. The new organization will be known as Collett-Week-Nibecker Inc., with head offices in San Francisco. Its products will be distributed by R. W. Greeff & Co. Inc., New York.

ASSOCIATIONS

Market Researchers Elect

New officers elected at the Chemical Market Research Association's annual meeting held in New York last month are: R. B. Wittenberg, International Minerals and Chemical Corp., president; W. H. Bowman, Jefferson Chemical, vice-president; J. M. Gillet, Victor Chemical Works, recording secretary; A. J. Fisher, U. S. I. Chemicals, corresponding secretary.

Councillors-at-large: W. M. Dennis, American Cyanamid and J. H. Boyd, Phillips Petroleum Co.

Committee chairmen named at the meeting are: L. H. Flett, National Aniline, membership; M. E. Clark, Wyandotte, statistics; L. J. Finnan Jr., Hercules Powder, program; and J. G. Park, Standard Alcohol, public relations.

New A. C. S. Section

A new local Section of the American Chemical Society has been chartered with headquarters in Houghton, Mich., it is announced by Alden H. Emery, of Washington, D. C., national secretary of the Society. The new unit, to be known as the Upper Peninsula Section, comprises

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Description— ● White odorless crystalline powder.

Assay— ● Contains not less than 99% of $Na_2CH_3AsO_3$. when dried at 150° C to constant weight.

Solution— ● A solution of one gram in 10 cc of distilled water is clear and colorless.

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chemists and chemical engineers of seven Michigan counties—Keweenaw, Houghton, Ontonagon, Baraga, Marquette, Iron and Gogebic.

Allen F. Olson, chemical engineer of the Cliffs-Dow Company, Marquette, is chairman of the Upper Peninsula Section and Ralph E. Menzel, associate professor of chemistry at the Michigan College of Mining and Technology, Houghton, is chairman-elect.

Anderson Joins Nuodex

Laurence E. Anderson, formerly with Newport Industries and National Lead Co., has joined Nuodex Products Inc. as sales manager of the recently formed west coast division.

SCI Elects Officers

New officers of the American Section of the Society of Chemical Industry are: chairman, S. D. Kirkpatrick, Chemical and Metallurgical Engineering; vice-chairman, Syril S. Kimball, Foster D. Snell, Inc.; secretary, Robert Hegge, American Chicle Co.; treasurer, Walter Baeza, consulting chemist.

Gum Association Officers

At its annual meeting held at the Plaza Hotel, The Water Soluble Gum Association of America, Inc. elected the following officers: president, E. A. Wieland; vice-president, H. A. Wittridge; treasurer, P. A. Dunkel; secretary, R. L. Zeno.

Research Institute Names Officers

Industrial Research Institute, Inc. held its eighth annual meeting on June 6 and 7 at the Statler Hotel in Cleveland, Ohio. C. S. Venable, director of chemical research, American Viscose Corporation, Marcus Hook, Pa. was elected president for the ensuing year and N. A. Shepard, chemical director, American Cyanamid Company, New York, N. Y. was elected vice president. C. G. Worthington was reappointed secretary and treasurer.

E. W. Engstrom, vice president, RCA

Laboratories Division, Radio Corporation of America, Princeton, N. J., and J. H. Schaefer, vice president, Ethyl Corporation, New York, N. Y., were elected to serve three-year terms on the board of directors.

Finance Cosmetic Research

The Allied Drug and Cosmetic Association of Michigan is planning to sponsor the establishment of a cosmetic research laboratory at Wayne University, Detroit.

The committee in charge of raising the necessary funds will be headed by Donald Melville, Frank W. Kerr Co., Detroit.

PERSONNEL

Wainer Enters Consulting Field

Eugene Wainer has resigned as associate director of research of the Titanium Alloy Mfg. Company to establish a research and development organization in chemistry and ceramics with headquarters temporarily at his home, 2654 Whirlpool Street, Niagara Falls, New York.

At present Mr. Wainer is on an extended business trip in Europe as a representative of the Titanium Alloy Mfg. Co. and will return on or about August 15, at which time his resignation becomes effective.

Du Pont Staff Changes

Five organization changes were announced recently by the Pigments Department of the Du Pont Company.

David H. Dawson has been appointed director of sales, replacing F. H. Weismuller, who was recently made assistant general manager of the department. Dr. Dawson has been assistant director of color research at the Newark, N. J., plant since 1944. James E. Booge has been made chemical director of the department, a new position with headquarters in the Wilmington office, and E. R. Allen has been appointed senior research associate reporting to the chemical director.

In addition, I. J. Krchma, previously assistant director of research at the Newport plant, has been made assistant chemical director for white pigments with headquarters at Newport, and W. F. Spengeman, research supervisor at the Newark, N. J., plant, has been appointed assistant chemical director for color pigments.

Standard Oil Advances Research Men

The Standard Oil Company (Indiana) has announced the appointment, effective July 1, of three new assistant directors of research. J. E. Seebold is named assistant director in charge of process design and exploratory economics. Nathan

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Fragen becomes assistant director in charge of pilot plant development work. B. H. Shoemaker is placed in charge of laboratory research on the production of chemicals from petroleum.

Other promotions effective at the same time include the appointment of two new section leaders. R. A. Steel will be in direct charge of process design work under Dr. Seebold, and A. L. Conn will be in charge of pilot plants, reporting to Dr. Fragen.

W. L. Webb simultaneously will become assistant executive director of the Whiting Research Laboratories. O. L. Hurley will take Mr. Webb's present position as assistant to the general manager of research. R. J. Austin has been promoted to the position of group leader.

Du Pont Promotes Dannenbaum

The Du Pont Company announces the appointment of Walter Dannenbaum as general manager of the Ammonia Department, succeeding F. A. Wardenburg, who retired June 30. Since 1931, Mr. Dannenbaum has been assistant manager of the department, which operates plants in St. Louis, Mo.; Philadelphia, Pa.; Belle, W. Va.; and is constructing a new plant near Orange, Tex.

Lose Lives in Hotel Fire

Two prominent chemical men, Eric Sommer, and Douglas L. Boyer lost their lives in the Chicago hotel fire of June 5.

Mr. Sommer held the post of technical assistant to the president of Linde Air Products Corp., New York, and Mr. Boyer was assistant general sales manager of Monsanto Chemical's Phosphate Division.

Clement Advanced by Monsanto

Monsanto Chemical Company announces the promotion of Sam R. Clement, assistant general branch manager of its Birmingham sales district, to assistant general manager of sales, Phosphate Division at St. Louis.

A native of Atlanta, Mr. Clement graduated in 1926 from the Georgia School of Technology and served as Monsanto's resident salesman at Atlanta before he was appointed to his Birmingham sales district position. He was Atlanta salesman for the Swann Chemical Company from 1931 to 1935 when the company was acquired by Monsanto.

Casein Company Promotions

Announcement has been made of the appointment of H. P. Fell and C. S. Leonardson as vice presidents of the Casein Company of America, Division of the Borden Company.

Mr. Fell, formerly production manager, and Mr. Leonardson, formerly west-

ern sales manager, as well as Nils Anderson, Jr., who was appointed a vice president in 1945, have also been appointed members of the Directing Board of the Casein concern.

Barnes Promoted by Ansco

Carl E. Barnes, formerly of General Aniline's Central Research Laboratory at Easton, Pa., has been named director of product and process development at Ansco. Formerly with Polaroid Corp., Dr. Barnes joined General Aniline two years ago.

Personnel Notes

EDWIN M. ALLEN has retired from his post as chairman of the board of The Mathieson Alkali Works. Mr. Allen will continue as a director of the company.

Lieut. MILTON E. HILL has returned to the sales promotion staff of the City Chemical Corporation, 132 West 22nd Street, New York City, following four years of service in the U. S. Navy.

ROBERT L. DUNCAN has been appointed Albany district sales manager for Carbide and Carbon Chemicals Corporation, a Unit of Union Carbide and Carbon Corporation. He will be in charge of the Corporation's new Albany office located at 50 State Street.

VIRDEN WILSON, formerly with Texas Co., New York, has joined Shell Chemical Corp., Houston, Texas, as senior technologist.

HARRY E. OUTCAULT, has been named assistant sales manager of the zinc oxide department of St. Joseph Lead Co., New York City.

WILFRED E. TURTON, formerly with the Barrett Division, Allied Chemical & Dye Corp. has joined Haas Brothers to head the concern's chemical department.

Among those who have returned from war duties to the employ of Virginia-Carolina Chemical Corp. are: EDWIN

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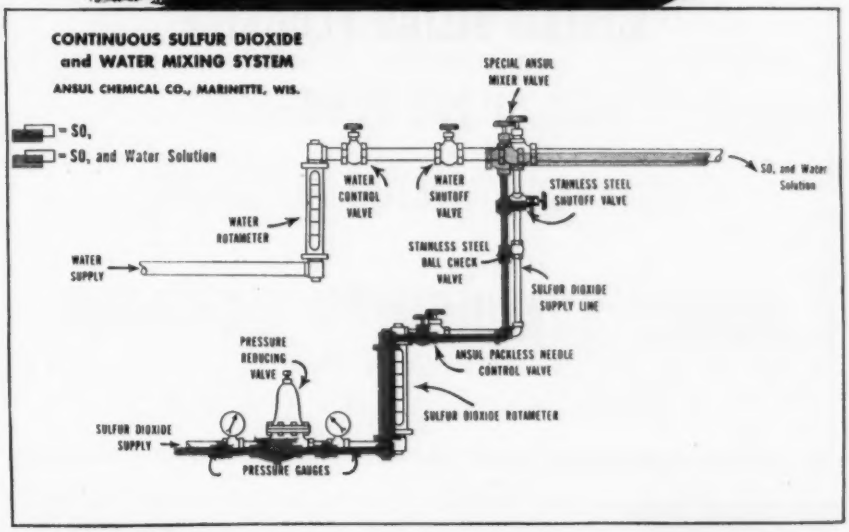

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Odor	Characteristic, pungent
Melting point	−103.9° F. (−75.5° C.)
Boiling point	14.0° F. (−10.0° C.)
Density of liquid at 80° F.	(85.03 lbs. per cu. ft.)
Specific gravity at 80° F.	1.363
Density of gas at 0° C. and 760 mm.	2.9267 grams per liter (0.1827 lb. per cu. ft.)
Critical temperature	314.82° F. (157.12° C.)
Critical pressure	1141.5 lbs. per sq. in. abs.
Solubility	Soluble in water
Purity	99.9+% (by wt.) SO_2 (H_2O less than 0.01%)

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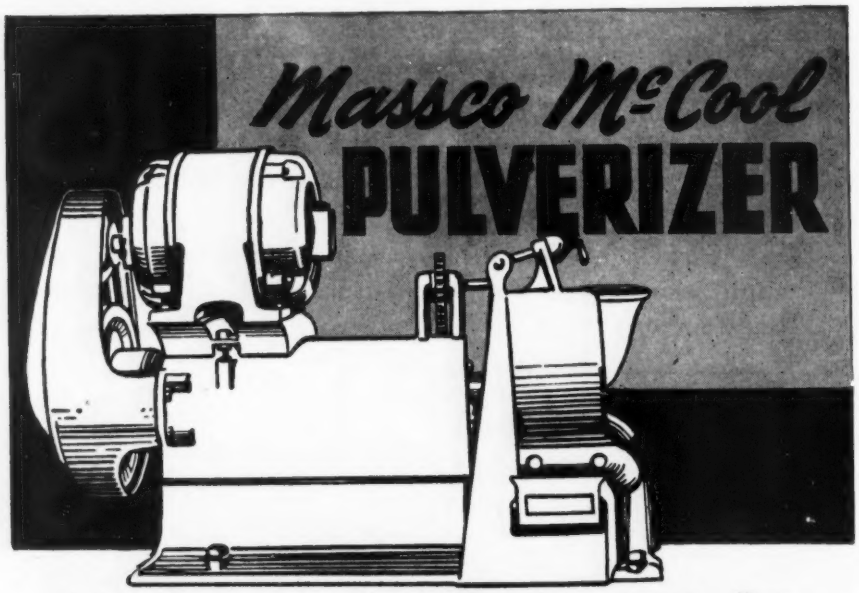

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Cox, William T. Thomas, Homer Moomaw, Raymond J. Lakey, and John Y. Mason.

Frederick H. Weismuller has been appointed assistant general manager of the Pigments Department of the Du Pont Company. He succeeds Crawford H. Greenewalt, who was recently made a vice president and member of the Executive Committee.

Merck & Co., Inc. announces the appointment of John F. Neill as an assistant secretary of the company. Manager of the New York branch since January 1946, Mr. Neill joined the Merck organization in 1935, after graduation from the University of Pennsylvania, Wharton School of Finance and Commerce.

C. H. Rybolt has been appointed sales manager of the Lucidol division of the Novadel-Agene Corp., Buffalo. He will devote most of his time to promoting the use of organic peroxides, and compounds, in the chemical and plastic industries.

Herbert L. Sherman, treasurer of the consulting firm of Skinner & Sherman, Boston, has been elected chairman of the newly formed New England District of the American Society for Testing Materials.

Robert S. Aries has been appointed director of The Northeastern Wood Utilization Council. He was formerly field director—a position which will now be filled by Richard J. Bandekow, formerly of the Plastics Division of the Glenn L. Martin Co.

William G. McLeod has been named general manager of the Dover, Ohio plant of W. C. Hardesty Co. Inc. He succeeds C. F. Williams, associated with the Dover unit for the past six years and who is now headquartered in Washington.

Clifford T. Butler has been appointed superintendent of the Hercules, Cal., plant of Hercules Powder Company, to succeed Leroy P. Hall who has resigned. Mr. Butler, now superintendent of the Hercules plant at Bessemer, Ala., transferred to California July 1.

D. S. Davis, author of numerous technical papers and books on industrial nomography, and formerly mathematician for the Wyandotte Chemicals Corporation, is now in charge of the Editorial Division of the Government Laboratories, Akron, Ohio, managed by the University of Akron, for Office of Rubber Reserve.

NEWS *of* SUPPLIERS

The Bury Compressor Co. of Erie, Pa., announces the election of B. C. O'Brien as president and general manager. Prior to joining the Bury Compressor Company, he was associated for a number of years with the Roots-

Connersville Blower Corporation where he was vice president and sales manager.

The Bury Compressor Company manufactures a line of motor-driven and steam-driven stationary air and gas compressors.

J. H. Swan of Klipfel Manufacturing Co., Chicago, and R. H. Thomas, president of Economy Pumps, Inc., Hamilton, Ohio, have announced the purchase of the Klipfel stock by Economy. Mr. Swan remains with the company in an advisory capacity, and as chairman of the Board of Klipfel.

The Klipfel Manufacturing Company is a producer of pressure regulators, tank thermostat valves, water level controllers, pressure relief valves and pilot operated valves.

Agencias Otis McAllister Ltda. has established offices in Colombia at Bogota, Medellin, and Cali. The agencias are equipped to give complete representation and sales service throughout Colombia.

In charge of the office in Bogota is R. A. Murillo, Pedro Lince is in charge of the Medellin office and Alphonso Concha R. is in charge of the Cali office.

The First Machinery Corp., formerly of 819-37 E. 9th St., New York City, has moved to new quarters located at 157 Hudson St., New York 13, N. Y.

In addition to serving the processing industries with rebuilt equipment, the First Machinery Corp. will introduce a far wider line of new machines including mixers, fillers, stainless kettles, tanks, cappers and conveyors.

The Warner Lewis Company, Tulsa, has acquired full ownership of Flotrol Systems, Inc., and will move Flotrol headquarters from New York City to Tulsa July 1, 1946, according to an announcement by Warner Lewis, president of the Tulsa firm.

The appointment of the **D. D. Foster Company**, 412 People's Gas Building, Pittsburgh, Penna., as Pittsburgh district representative, has been announced by the Hammond Iron Works, Warren, Penna., fabricators and erectors of steel storage tanks for liquid and dry storage and steel and alloy plate work.

Filter Paper Company, manufacturers and distributors of Filco tanks, presses, filters, portable agitators, conveyors and filter media, has moved into their new, larger quarters at 2426 South Michigan Avenue, Chicago, Illinois.

Speedways Conveyors, Inc., 1261 Niagara Street, Buffalo 13, New York, announces the appointment of Jess Keville as exclusive representative for Speedways material handling equipment in Southern California and adjacent territory.

The **Hammel-Dahl Company** of Providence, Rhode Island, manufacturers of automatic control equipment, announces the appointment of Wayne B. Farley as district manager of their Pittsburgh Office.

Purchase of a new plant and plans for construction of additional manufacturing facilities by **Minneapolis-Honeywell Regulator Company** are announced by George A. DuToit, Jr., vice president in charge of production.

Honeywell has acquired from the Heidbrink division of the Ohio Chemical and Manufacturing Company the two-story plant adjacent to its main plant in Minneapolis. The new factory contains approximately 22,000 feet of manufacturing space with footings for the addition of a third floor. Land adjacent to the building, will be available for further expansion and will permit a wing 100 feet by 125 feet to be added if such action is ever deemed necessary.

Current plans call for moving Honeywell's plastic molding department, including the plastic laboratory, into the new factory by next month, with operations started by July. When the move is completed and full operations underway, about 250 employees will be required to staff the new plant.

Two executives who occupied important posts in the war-time production program of **Olin Industries, Inc.**, have been elected to the corporation's board of directors. They are B. E. Bassett, former general manager of The United State Cartridge Company, operators of the St. Louis Ordnance Plant, and Russell R. Casteel, secretary and counsel of Olin Industries and affiliated corporations. Both of the new directors have been members of the Olin Industries organization since May, 1936.

Acme Steel Company of Chicago has purchased the entire Morrison stitching machine division from Harris-Seybold-Potter Company of Cleveland and Dayton, Ohio. The Morrison line will be used to supplement and augment the present business of the Stitching Wire and Machine Division of the Acme Co.

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Agriculture

(Continued from page 80)

Technical Bulletins

TB 364—The Composition and Distribution of Phosphate Rock with Special Reference to the United States. K. D. Jacob et al (1933)
TB 619—Soybeans in the United States: Recent Trends and Present Economic Status. E. W. Grove. (1938)
TB 626—Stumpage Prices of Privately Owned Timber. (1938) 20¢
TB 737—Wholesale Prices of Fats and Oils in the United States: Index Numbers, 1910-39. R. M. Walsh. (1940)
TB 891—Marketing and Manufacturing Margins for Textiles

Agricultural War Information Series

AWI 35—Grading Soybeans
AWI 37—Grading Flaxseed

Statistical Bulletins

SB 59—Fats, Oils, and Oleaginous Raw Materials: Production, Prices, Trade, Disappearance in the United States, 1912-1935, and Available Data for Earlier Years. Anne Dewees. May 1937.
SB 64—Statistics of Forest Products in the Rocky Mountain States. R. V. Reynolds and A. H. Pierson. November 1938.
SB 65—Forest Products Statistics of the Pacific Coast States. R. V. Reynolds and A. H. Pierson. December 1938.
SB 68—Forest Products Statistics of the Lake States. R. V. Reynolds and A. H. Pierson. May 1939.
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Mining of Fuller's Earth Extended

Sales of fuller's earth in the United States in 1945 totaled 296,368 tons, according to reports of producers to the Bureau of Mines. Since 1940 the industry has recovered most of the volume lost during the depression and output is nearing the record of 335,644 tons set in 1930.

Although sales of fuller's earth for rotary drilling mud decreased in 1945, there were increases in all of the other major uses. Producers reported that 65 percent was consumed in mineral oil refining and 9 percent in vegetable oils. Absorbent uses, such as removing oil from factory floors, have steadily increased in volume since 1942, and in 1945 consumed 19 percent of the total output.

The Georgia-Florida district produced 45 percent of the total, and the largest output of any State came from Texas, which furnished 35 percent of the total. The average value rose from $11.19 in 1944 to $11.69 in 1945.

Sterling Buys Breon

Sterling Drug, Inc., Delaware, has acquired the entire capital stock of George A. Breon Co., pharamaceutical manufacturers, Kansas City, according to James Hill, Jr., president of Sterling Drug. Price of the transaction was not revealed, but it was reported to involve more than $2,000,000.

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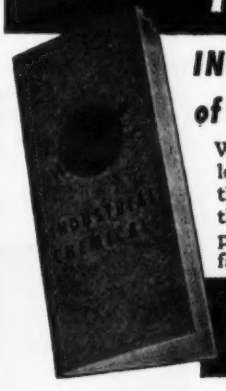

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CHEMICAL SPECIALTIES NEWS

Wild Ginger Being Studied As Bactericidal Agent

Wild ginger (Asarum Canadense), a plant abundant in woods from New Brunswick to Manitoba in Canada and as far south as North Carolina, Missouri and Kansas, produces bactericidal agents "as active as penicillin on some organisms," according to studies being made in the research laboratories of the Winthrop Chemical Company, Inc., Rensselaer, N .Y.

The experiments so far have revealed .002 per cent of antibiotic substances by weight in each plant. Two such substances have been found in each specimen of wild ginger, which are classified as "A" and "B." Of the two "A" is a potent colorless compound which has been given the tentative empirical chemical formula of $C_{21}H_{20}O_8N_2S$.

It is said to be active against the pus-forming Gram-positive bacteria, staphylococcus, streptococcus and also pneumonococcus, but has no effect on intestinal bacteria. "B," a lemon-yellow acid, is somewhat less potent.

Pennsalt Markets New Cleaners

First production of two new products, Pennsalt Cleaner A-22 for aluminum alloys and PM-95, an acid base cleaning and descaling compound, is announced by the Pennsylvania Salt Manufacturing Company.

Pennsalt Cleaner A-22 is a general purpose soak tank cleaner for use on all aluminum alloys. Most common applications are cleaning aluminum before anodizing, chromodizing, phosphatizing and other pre-painting treatment and before deoxidizing and subsequent spot welding.

Pennsalt PM-95 is a cleaning and descaling compound containing additional agents for surface action and inhibition. Suggested uses are general pickling and metal descaling, especially for difficult-to-remove oxides resulting from heat treating or annealing.

DDT-Lime Compatibility Discussed

To correct a widespread impression that DDT cannot be used in any mixture containing hydrated lime, Geigy Co. Inc. has recently issued the following statement:

"DDT wettable powders and DDT emulsifiable solutions are compatible with Bordeaux mixture, but it is recommended that the Bordeaux be made up first with the addition of DDT powder or solution after the tank is nearly full of water."

However, it is noted that DDT is not compatible with hydrated lime in dust mixtures, and when DDT is dry-mixed with hydrated lime the resulting powder is highly ineffective as an insecticide.

MacGregor Heads Unexcelled Chemical

C. Russell MacGregor has been elected president of the Unexcelled Chemical Corporation, New York, formerly the Unexcelled Manufacturing Company. Mr. MacGregor succeeds Thomas Jardine, who becomes vice-chairman of the board.

The company, which before the war manufactured fireworks, now produces industrial finishes, wood and cordage preservatives, bronze powder, plastics and an insect repellent.

Novel Rubber Cement

Adhesive Products Corp. announces that it has developed a new type of rubber cement which in color cannot be differentiated from rubber cements made with natural latex crepe rubber.

It is claimed that the new product, known as Adco Snow White rubber cement, will not discolor and has many of the characteristics of natural rubber compounds. It is available without restriction.

Thompson Chemical Changes Hands

The Thompson Chemical Co., Pawtucket, R. I,. has purchased the business of the former Thompson Specialties, Inc., Springfield, Mass. The new organization will continue to manufacture the "Tip-Top" line of household and automotive specialties.

Albert Pilavin has been named sales manager, with Victor Baxt in charge of production.

New DDT Formulation

Synthex Products Co., New York, has recently placed a DDT-containing liquid on the market which may be applied to screens, window frames, walls, etc., as a plastic film. It is said to remain effective for about four months in that the DDT cannot powder and blow away.

It is sold as a concentrate, which can be diluted with an equal quantity of water.

Soap Used for Textile Process

A boiling soap solution is recommended by W. I. Taylor and J. F. Levers in U. S. Patent 2,376,983 for the crinkling of cellulose-derivative pile fabrics. Thus flat filaments of cellulose pile fabrics are given the granulated appearance of animal pelts (e.g. lambs wool or sheepskin) by crinkling without tension in an aqueous solution containing 2.5 gm. of soap per liter.

Treatment for from two to four hours in this boiling solution yields a dull finish, soft pile, fabric.

Evaluate Mosquito Repellent Solvents

Rutgers 612 (ethylhexanediol) has been found to repel the Aedes aegypti for a longer period if mixed with one of the alcohols than if used in pure form. According to a report in the National Research Council's Abstract Bulletin of the Insect Control Committee Coordination Center, certain substances augment the

Zick Joins Heller as Vice-President

W. J. Zick, formerly sales manager of Stanco Inc., has joined B. Heller & Co. Inc., Chicago. Mr. Zick is seen here at the NAIDM convention with Preston B. Heller.

effective duration of a repellent while others decrease the effectiveness.

The most effective solvents for Rutgers 612 were those in which the concentration of isopropyl alcohol was 30%, heptyl alcohol 50%, benzyl alcohol 80% or glycerol 50%.

Market New Fungicide

A fungicide, safe for household use, which destroys mildew and prevents its return for months is claimed by the Interchemical Corp., Fair Lawn, N. J. The product is called "Mil-Du-Rid."

The fungicide is a colorless, highly concentrated liquid. Diluted with water, it is safe to use on fabrics or any surface that would not normally be injured by soap and water.

Used as a preventive, the liquid will keep mildew from forming in the most humid conditions, assert the makers. It is said to be able to kill garbage odors, mildew on clothing, rugs, furniture, draperies, and shower curtains.

The Interchemical Corp., which is now marketing this product, recommends the liquid for use in sprinkle water for laundry that cannot be ironed immediately. This will prevent mildew from forming.

Powder Form DDT Spray Base

A powder form, 50 per cent DDT, composition has been placed on the market by Pennsalt, designed for use with water either as a livestock dip or spray for the control of flies and similar pests.

Packaged in two pound paper bags, use of the compound is suggested as a means of wetting out livestock hair, to provide residual toxicity, as well as for spraying the walls of barns, milk houses, and pens.

Coating for Polystyrene

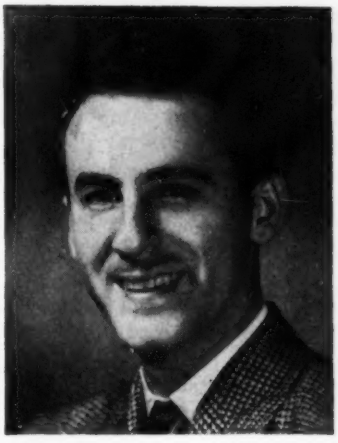
A new high gloss protective and decorative coating for polystyrene plastics is announced by Maas & Waldstein Company, manufacturer of specialized production finishes. The new coating, which is named Stylac, is an air-drying non-crazing lacquer, claimed to have excellent adhesion and humidity resistance.

Fruit Cleaning Chemical Process

A method of cleaning and disinfecting, as well as preventing decay of fruits, especially citrus fruits, and vegetables forms the basis of a process described by A. F. Kalmar in U. S. Patent 2,374,209.

Such products are prepared for shipment to market by scrubbing and soaking with special equipment for four minutes in an aqueous solution containing 0.2 per cent soap and 0.5 per cent sodium carbonate as detergents, 0.15 per cent sodium orthophenylphenolate as a disinfectant, and 1 per cent of sodium pyrophosphate as a buffer to maintain the pH above 10. The surface solution is then rinsed off, but blemishes and decay are penetrated permanently.

Franzreb Joins Turco



Thomas G. Franzreb, recently released from the Navy, has joined Turco Products Inc. in the technical service division. He will be headquartered at Los Angeles.

Hectograph Blanket Formula

According to the claims of W. J. Champion, in the U. S. Patent 2,387,643, a hectograph blanket having a copy mass of improved mechanical resistance and low sensitivity to hydrothermal factors is obtained through the inclusion of a small portion of a suitable silicate. Glycerine, a standard component of hectographs of all types, is specified as the major plasticizer needed to obtain the full benefits of the new improvement.

The following formula is given for a hectograph blanket adaptable for use in roll form:

Gelatin (220 bloom)	50 parts
Water	100 "
Glycerine	500 "
Corn syrup	100 "
Sodium silicate	5 "

Patterned Lucite Developed By du Pont

A process has been announced by Du Pont, to produce shatter-resistant sheets of "Lucite" acrylic resin with surface patterns formed on them as they are made. Major applications are expected to be for decorative and utility purposes, ranging from washroom windows to edge-lighted panels for hotels and night clubs.

Development of the process has been achieved since the end of the war. Although commercial production has not started, the new material, known as patterned "Lucite," will be available soon in twelve standard designs. The sheets are not only for new applications, but may be easily formed or machined into any of the articles now familiar in crystal-clear "Lucite."

Antiseptic Cleansing Spray

A recently suggested cleansing spray, with antiseptic properties, for telephone mouthpieces is composed of the following ingredients:

Soap, alcoholic tincture	10 parts
Alcohol	5 parts
Thymol	1 part
Water	50 parts
Pine needle oil	to suit
Peppermint Oil	to suit

If a more definitely antiseptic spray is desired the preparation may contain one of the chlorinated phenols, some of the more active essential oils, resorcinol, guaicol, or the newer antiseptic compounds, such as cetyl trimethyl ammonium bromide. However, it is necessary to consider such additions carefully to avoid including incompatible materials.

New Anesthetic Holds Promise

Metopryl, a new anesthetic holding some promise, has been developed at the University of Maryland. According to John Krantz, head of the department of pharmacology, metopryl is claimed to induce greater muscular relaxation with 25 per cent less danger than ether.

Although it has been used on human beings it is conceded that more extensive tests must be completed before its comparable merit can be fully determined.

Pennsalt Develops a New Spot Remover

Pennsylvania Salt Manufacturing Company has developed a new paint, oil and grease remover for use in laundry or wet cleaning operations. The product, named Erusto Solvent, can be completely removed by washing or rinsing in water. It is packaged in one gallon cans.

Develop High Blood Pressure Remedy

A new compound to reduce high blood pressure is under development in the research laboratories of Frederick Stearns & Co. Division, Sterling Drug, Inc.

In pharmacological experiments, the compound, one of a series of amines under investigation, appears to be more effective in lowering high blood pressure than do the customarily used nitrites, A. M. Lands, Stearns' director of pharamcological research, states.

Temporarily the compound is known as O-4, 277, or chemically as 1-(p-hydroxyphenyl 1)-2-isopropylaminoethanol. Dr. Lands says that experimentally it has proved active in "producing a marked and prolonged fall of blood pressure," giving the compound "a most favorable therapeutic ratio." It may be administered orally, intravenously, or intramuscularly.

CANADIAN NEWS

Scope of National Research Broadened

A bill to amend the National Research Council Act, adopted by the House of Commons last month, calls for the continuance of the Committee of the Privy Council on Industrial and Scientific Research; for the appointment of two vice-presidents to the Research Council, and the creation, organization, and administration of "corporations to carry out certain powers of the Council which may be more conveniently performed by a separate corporation."

The bill authorizes the setting up of a Canadian Research Corporation, similar to the U. S. organization, as a non-profit concern to receive and exploit patents from the National Research Council, other government departments, and such universities and public institutions which desire to make use of its facilities.

The N. R. C. has greatly expanded since its inception in 1916 in order to meet the needs of Canada in this technological age. In 1928 a full-time president was appointed and a decision was taken to provide a research laboratory building. Heretofore, the Council had confined itself to awarding scholarships, making financial grants in aid of research to university and other workers, and to organizing co-operative research projects.

The Council's budget in 1928-29 was $300,000. By 1938-39 this had increased to approximately $1 million, and the total staff numbered just under 300. As a result of war-time expansion of activities the Council in 1945 supported directly a staff of 1600, and indirectly another 400, while total direct expenditures amounted to nearly $7 million.

The government has decided that peacetime needs for scientific research require the maintenance of Council activities on the same order of magnitude as in war and in estimates for the fiscal year the needs of the Council are placed at about $6¾ million, which is apart from very sizable expenditures on atomic energy.

The full-time civilian staff will number about 1500 and, besides the one large laboratory building of 1939, the Council is now operating 16 other laboratories in Ottawa, Montreal, Chalk River, Winnipeg and Saskatoon.

Socialist Government Enters Chemical Field

The Premier of Saskatchewan recently disclosed that the government of that province intends to build and operate a sodium sulfate processing works at Lake Chaplin, about eighty miles west of Regina. Operations were scheduled to begin June 15th, using a "saline deposit method." The International Nickel Company and another private operator are already working at the lake, using the mining method.

Sodium sulfate is almost a complete natural monopoly to Saskatchewan, in that Georgia is the only other North American source. Large-scale development of the provincial plant depends on findings of the engineering and economic survey which has been carried on for about a year. The potential market for the product is estimated at from 60,000 to 100,000 tons a year.

Advanced to Research Post

R. D. Perry, appointed to the recently created position of general superintendent of research and development of Consolidated Mining & Smelting Co. of Canada Ltd. Mr. Perry has been with Consolidated since 1928.

Inco Faces Anti-Trust Action

The United States Department of Justice has initiated a civil antitrust proceeding in the Federal Court in the City of New York against the company, its American subsidiary and three of their principal officers.

The complaint charges the defendants with conspiring to restrain trade in and with monopolizing the nickel industry in violation of the Sherman Act. The suit seeks complete separation of the business of Inco, Ltd., and its American subsidiary.

Robert C. Stanley, chairman and president of the Canadian parent company, stated it has been their unceasing effort to increase the demand for and usefulness of nickel and to serve the best interests of users of nickel in the United States. Divestment of American assets would only impede the development of new applications for nickel and bring to an end the services now provided to American industry through the American subsidiary.

R. L. Beattie, company vice-president and general manager, commented in part on the action:

"Our nickel is in active competition with the production of other producers, including that of the United States Government itself from the Cuban deposits, and also it is in competition with many other alloying elements. The prices we have charged in the United States have been so low as to require the United States Government to give substantial subsidies to our competitors.

The company has no agreement with any of its competitors which prevents their competing with it in the sale of nickel in the United States' market or elsewhere."

Canada is dependent upon the American market for the major part of the sales of the singularly Canadian product, nickel. The price has been maintained since 1926.

Shawinigan Extends Sales Activities

Shawinigan Chemicals, Ltd., major Canadian producer of carbide-based chemicals, has recently opened a branch office in Toronto, in a move which further points up the company's plans to expand sales activities. In past years, Shawinigan, with output confined to a comparatively few heavy tonnage items, has not placed much emphasis on chemical marketing, and less than carload lots were handled by agents.

The new office, under G. K. Wright, will look after distribution of Shawinigan's own products, as well as those of Carbide and Carbon Chemicals Corp. and Sharples Chemicals, Inc., in Toronto.

Smelters Plans Major Expenditure

Consolidated Mining and Smelting Company of Canada, Limited, plans to spend $3 million in the near future at the Sullivan mine and concentrator at Kimberly, B. C. This sum will be appropriated to build a new 4-mile haulage way from the mine center to the concentrator, including 2 miles of rock tunnel, for a new underground crushing works.

Also included is an addition to be made to the concentrator for preliminary ore treatment by the "sink and float" process.

Johns-Manville Expands

The acquisition of a new factory site at Port Union, Ontario, about 17 miles east of Toronto, has been announced by The Canadian Johns-Manville Company, Limited, a subsidiary of Johns-Manville Corporation of New York.

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MARKET OUTLOOK

Soap Industry Confident Of Future

Export Drug Sales Due to Advance

Extract Shortage Hits Tanners

Rotenone Prospects

Market Review

●

Soapmakers' Prospects Basically Favorable

The soap industry, although it has been plagued by raw material shortages during the war, has chalked up new output records during the past few years, both in terms of tonnage and dollar volume. Sales have risen sharply from $198 million in 1940 to 1944's $322 million, and $302 million for the first nine months of last year.

In view of the drastically curtailed availability of the soaper's main raw material—coconut oil—manufacturers have had to rely largely on domestic supplies of fish oil, rosin, tallow oil, etc., to extend production. Likewise, in the light of existing quotas, toilet soap output has been increased, at the expense of the cheaper and less profitable laundry grades. Granulated soaps rose, while flakes declined, even though industry consumed heavier quantities of bulk chips and flakes.

The shortage of fats and oils is the chief immediate concern of the industry but the Dept. of Commerce regards prospects for increased shipments of palm oil and copra from the Philippines in the near future as favorable. Too, the inroads made by synthetic detergents in the textile and shampoos fields has not been overlooked by soapers, nor is the overall competition likely to be experienced from this quarter being discounted.

What influences the total consumption of soap? In examining data pertaining to both prices and consumption it is evident that the degree of industrial activity and status of income levels are the paramount factors. Augmented industrial production adds workers to heavy industry, where the nature or the occupation requires greater use of soap. Furthermore, in times of business prosperity there are more dwellers in smoky cities and congested areas. Likewise, the consumption of soap in manufacturing processes is increased, and in prosperous times families include in their budgets more money for soap purchases.

Therefore, the primary factors which influence prospects are the two greatest "ifs" of all—future levels of income and manufacturing activity. If these can be maintained satisfactorily, demand for all kinds of soap is expected to continue near current highs.

Drug Export Sales Due to Advance

The U. S. pharmaceutical industry, which prior to the war had a yearly output valued at a third of a billion dollars, and since has advanced to the billion dollar per annum category, may well anticipate the realization of a $200 million per annum export market in 1947. Already, present foreign sales represent a seven-fold increase over 1938 values.

Since that year, overseas sales of U. S. household remedies have been upped from $8 million to about $28 million in 1945. Prescription pharmaceuticals made up the rest of last year's $116 milllion total.

Too, in prewar years drug exporters had only about twenty worthwhile foreign markets, even though the U. S. produced a third of the world's pharmaceuticals. However, in 1945 there were sixty-four countries buying at least $100,000 worth of U. S. products, of which twenty countries took from $1 to $12 million. Prescription pharmaceutical sales increased ten fold; packaged remedies trebled.

The biggest handicap to the realization of a $200 million export trade in this field, is said to be the deplorable shortage

Market Review

Heavy Chemicals—The entire chemical market remained strong and firm during the month, with inquiries and orders, both for domestic and export markets, far in excess of productive capacity. The alkalies, in particular, were difficult to obtain.

Caustic soda, soda ash, trisodium phosphate, and sodium bicarbonate remained scarce, and odd parcels on the resale market moved rapidly into consuming channels. Prices as high as 6 cents for TSP were quoted, and as high as 3 cents for soda ash. The long-serious situation was aggravated by a strike at the plant of a major producer, and trade factors fear that most alkalies will not be reasonably available until well on into the year. Sulfuric acid output increased, with demand steady, and slated to increase as steel production rises. Sodium sulfide tightened, with odd parcels picked up at 5 cents.

In the solvents category, butyl alcohol and butyl acetate supplies were pared, as producers were unable to obtain corn at ceiling prices. Methanol output fell far short of demand, and although major shipments were dispatched to formaldehyde units, the latter chemical continued in short supply to adversely affect the outlook for several plastics. There appeared to be no inclination on the part of toluol manufacturers to meet low government surplus prices, and a more competitive situation is anticipated within the next few months. Aniline oil strengthened and rumors circulated to the effect that price increases are in the offing.

Fine Chemicals—Nicotinic acid and pyridoxine eased to $6 and $900 per kilo, respectively—the first change in the price of the latter commodity in several years. Small lots of Chinese menthol sold at $7, with gum arabic remaining firm at 14½ to 15 cents in spite of recent arrivals. The unloading of the first shipments of mercury from Italy in four years did not influence the dull market existing in that commodity. Acetylsalicylic acid, acetophenetedin, saccharin, coumarin, and vanillin were all hit by the closing of the main producer as a result of labor troubles. However, some 4,500 cases of vanilla beans were reported en route to the U. S. from Madagascar. Sodium perborate and phenol both commanded premium prices, as did potassium permanganate. Imported tartaric continued to sell below domestic price levels to pose a problem for the future.

Agricultural Chemicals—Copper sulfate crystals and monohydrate moved into higher brackets with OPA granting ceiling price increases of 65 cents a cwt. on the former. Monohydrate rose to $10.10, up 90 cents, as a result of the copper metal price rise. Rotenone ceilings were also eased by 3 cents per pound on imported roots, and 4 cents on powder—for importers—with compounders permitted to pass along the increment to consumers. Heavy tonnages of DDT moved direct from producer to user, and occasional lots at 52 cents failed to attract much interest. New ceilings on phosphate rock foreshadowed price increases in superphosphate and fertilizers. Sodium nitrate remained in short supply, and prices of ammonium sufate and lead arsenate rose as a reflection of bolstered costs.

of experienced foreign traders. Nevertheless, it is felt by the Dept. of Commerce, that a sufficient number of qualified foreign sellers are becoming interested in sales potentials to render the export goal attainable.

Chestnut Extract Situation Curbs Tanners

With output decreasing steadily since 1941, production of chestnut extract, has dipped so sharply that allocations of this raw material essential to the manufacture of sole leathers, are now well below the tanning industry's minimum needs. Furthermore, little prospect of any easing in the supply situation is evident.

Of all the materials available for producing tanning extracts, domestic chestnut wood accounts for about 28 per cent of the total consumption, with imported raw materials and extracts aggregating about 65 per cent. Inventories of chestnut wood, are now virtually non-existent, and several industrial extractors have been forced to terminate operations.

Chestnut wood inventories have declined from 476,000 cords in early 1942 to 154,000 in the last quarter of 1945. Production of chestnut extract dropped from 82 million pounds in the second quarter if 1942 to 47 million pounds in late 1945. Apart from the shortage of raw material available in this country, considerable uncertainty surrounds the prospective supply of Argentine woods.

CPA proposes to extend preferential ratings to bolster logging operations, and is endeavoring to assist tanners in the development of alternative tanning methods. Too, OPA has increased ceiling prices on cordwood, which will undoubtedly result in an upping of chestnut extract prices. Nevertheless, no easing of extract availability can be counted on for some months to come.

Hope New Crops May Ease Rotenone

Although Japanese neglect of derris root plantings in British Malaya has caused a widespread shortage of the root's extract—rotenone—the Dept. of Commerce hopes that the situation may be eased somewhat by the steps which have been taken to import all of Middle America's output.

Working with the U. S. Dept. of Agriculture's tropical experiment station at Mayaguez, Puerto Rico, the United Fruit Co. developed extensive plantations during wartime, and encouraged long-range cultivation of the root in Haiti, Mexico, Honduras, Guatemala, Costa Rico, and the Dominican Republic. This crop, permanent and profitable in peacetime, is counted upon to assist in the alleviation of the shortage occasioned by the deterioration of 2000 of the 4000 acres previously under cultivation in Malaya.

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CHEMICAL ECONOMICS & STATISTICS

Zinc Stockpiles Continue to Drop

The downward trend of zinc smelter stocks continued in May, marking the third successive month that unsettled labor conditions have contributed to stockpile decreases. Production, however, which in April had fallen to the lowest point in over a year, rallied slightly and showed a 1,516-ton increase.

Figures released by the American Zinc Institute revealed the paradoxical condition of production rising slightly, total shipments decreasing slightly over April figures, unfilled orders decreasing, and yet stocks, which might have been expected to hold their own, decreasing to 241,442 tons. This is a drop of 7,264 tons over April and marks the lowest point stocks have reached since the end of the war last August.

The stocks credited to the Government's account, which had been halved in April from a high figure of 15,210 tons to 6,706 tons, took another drop. The May volume was put at 4,989 tons.

Daily average production for May compares unfavorably with the production figures in both 1946 nad 1945. The May figure of 2,013 tons is 27 tons less than the April figure of 2,030 and 177 tons less than the 1945 daily average of 2,190.

Dry Casein Output Doubled

April dry-casein production in the U. S. was more than double that of March, according to estimates of the BAE. This greater than seasonal rise in output apparently resulted in part from the anticipated rise in the domestic ceiling prices on dry acid casein.

Casein manufacturers dried 1,510,000 lbs. of casein during April and held 3,850,000 lbs. in their warehouses at the end of the month. Dry casein production during April was only 3 per cent lower than April, 1945, while in March it was 26 per cent less than a year earlier. Domestic producers held 51 per cent more stocks of dried casein on April 30 this year than on that date last year.

Sodium Sulfate-Carbonate Tonnage Up

Sales of natural sodium sulfates and carbonates increased in 1945 over 1944, with carbonate sales establishing a new record, according to the Bureau of Mines. Natural sodium sulfate is used principally in the West and South in the manufacture of kraft paper, glass, in stock feeds, and as a flux in metallurgy. Natural sodium carbonate is consumed principally on the Pacific coast, where it is used in glass manufacture and in alkali cleansers. Sales data are given in the following table.

	Sodium sulfates[1]		*Sodium carbonates*[2]	
Year	*Short tons*	*Value*	*Short tons*	*Value*
1940	184,571	$1,528,633	130,034	$1,629,283
1941	154,327	1,443,137	146,677	1,822,986
1942	169,870	1,669,983	150,619	2,145,289
1943	160,622	1,553,549	165,993	2,544,086
1944	168,923	1,577,982	184,826	2,869,243
1945	178,196	1,525,159	194,045	3,034,118

[1] Tonnage figures for sulfates include Glauber's salt converted to 100% Na_2SO_4 basis. In earlier mineral market reports of this series the figures given for sulfates include those for Glauber's salt not so converted and were as follows—1940: 187,233 tons; 1941: 157,524 tons; 1942: 175,033 tons; and 1943: 165,908 tons. Figures for 1940-42 include some burkeite.
[2] 1940-41: Soda ash, bicarbonate, and trona; 1942-45: Soda ash and trona.

Strikes Curb Lead Production

Unsettled labor conditions, especially at the mines and smelters in the Western States, continued to restrict the domestic mine production of lead in April. The average daily production was 963 short tons compared with 985 tons in March.

The strikebound smelters, refineries, and mines of the American Smelting & Refining Company and the Utah operations of the United States Smelting, Refining & Mining Company remained inoperative during the month. The smelter strikes did not materially affect the output of the large lead mines as these properties continued to operate and store the concentrates produced. However, mines with limited storage facilities or dependent upon prompt payment of smelter returns for operating expenses have been forced to close.

The April production of 28,881 short tons of recoverable lead was 3,533 tons (11 per cent) under the monthly average during 1945; was smaller than any month since the Bureau of Mines' monthly figures were inaugurated in January 1941; and was below the average monthly production of any year since 1935.

Western Phosphate Rock Sales High

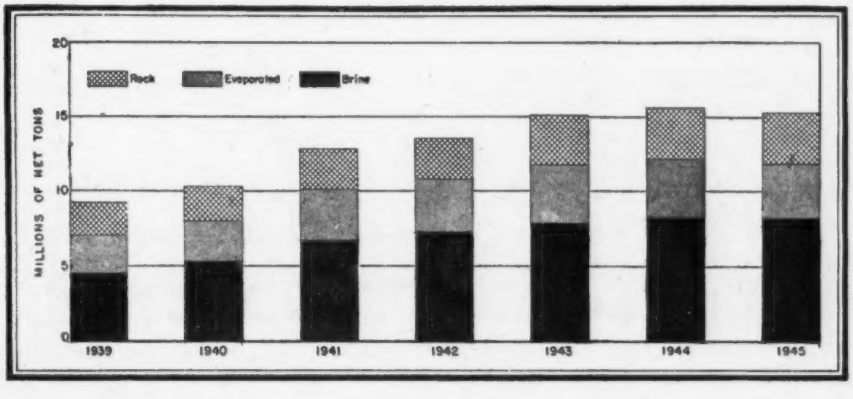
A new high record for the value of the phosphate rock marketed featured the Western States phosphate rock industry in 1945, when the total value of that sold or used exceeded 1½ million dollars ($1,589,915), according to reports from producers to the Bureau of Mines. This, an increase of 18 per cent over the 1944 figure, reflects a higher average value per ton of rock. The tonnage marketed, however, (274,198 long tons with a P_2O_5 content of 88,052 tons) was less in 1945 than in 1944 when 298,999 tons, containing 95,767 tons P_2O_5 were sold or used. This was a decrease of 8 per cent from the record high of the previous year, but it still remained greater than for any other year.

The production in 1945 came from Idaho and Montana; only development work was reported in Wyoming, and Utah remained inactive. The average P_2O_5 content of the Western States phosphate rock sold or used in 1945 is reported to have been 32.11 per cent, a little above that of 1944 (32.02 per cent).

Asbestos Output Gains

Asbestos production in the United States in 1945 experienced a substantial gain over 1944, according to the Bureau of Mines. As in previous years most of the domestic output consisted of the shorter grades of chrysotile mined in Vermont. Production in 1945 totaled 13,605 short tons compared with 7,558 tons in 1944, a gain of 80 per cent. Domestic sales reached 12,252 short tons, a gain of 84 per cent over 1944. The domestic producing industry furnished

U. S. Salt Production



only 3 per cent of total consumption in the United States during 1945.

Canada furnished a large part of the United States requirements of shingle stock, paper stock and other of the non-spinning grades. Africa supplied a substantial part of longer grades that were of great importance in the military program, and that will continue in strong demand under peacetime conditions. Woven friction materials particularly for automotive manufacture, and packings and gaskets employed in power-generating plants are among the important uses of the long fibers.

Amosite asbestos, used extensively in making 85-percent magnesia and other high-temperature molded insulation, is obtained only in South Africa. Blue asbestos (crocidolite), is obtained chiefly in South Africa although small quantities sometimes originate in Australia.

Tremolite asbestos which is of value for filtering chemicals was mined in Maryland for many years until the deposit was exhausted. Production has now shifted to California and Alaska.

Potash Sales at Record Level

The record-breaking schedule of deliveries established by the five major American potash producing companies during the war has continued during the first quarter of 1946 when 464,598 tons of potash salts containing 259,639 tons of K_2O were delivered.

This represented an increase of 7 per cent in salts and 12 per cent in K_2O over the corresponding period in 1945. Deliveries for agricultural purposes in the United States, Canada, Cuba, Puerto Rico, and Hawaii consisted of 430,379 tons of potash sales equivalent to 238,378 tons of K_2O, compared to 206,745 tons K_2O in the first three months of 1945.

Muriate of potash predominated with 214,402 tons K_2O, whereas 16,846 tons were delivered as sulphate of potash and sulphate of potash magnesia, and 7,130 tons as manure salts.

Deliveries for chemical purposes totaled 26,078 tons of salts equivalent to 16,282 tons K_2O, a reduction of 33⅓ per cent from the corresponding period a year earlier. Exports to other countries amounted to 8,142 tons of potash salts containing 4,979 tons K_2O.

Pulp-Paper Output Upped

The production of wood pulp, paper and paperboard in February was substantially greater in 1946 than in 1945, and the daily average output of paper for February of this year was 7 per cent greater than for January, 1946, the Bureau of the Census reported in its regular monthly release. Even though February, 1946, was shorter than January by three working days, pulpwood receipts were 143,000 cords larger, a particularly encouraging fact. Wood pulp production in February equalled the January production, principally because a near-capacity supply of pulpwood was available in the South.

Pulpwood receipts in February, 1946, were 1,496,453 cords, as compared with 1,353,943 cords in January. The largest increase took place in the South, where receipts increased by 112,000 cords. All other regions registered declines except the Lake States where a slight increase occurred. Consumption was slightly less in February than in January.

Wood pulp production was 775,760 tons in February, only about 10,000 tons less than the January figure. The much higher daily average production in February was largely due to increases in the output of sulphate wood pulp. Production of all other grades was somewhat less in February than in January.

Consumption of wood pulp in paper and paperboard manufacture totaled 905,266 tons in February, some 41,000 tons less than in January, 1946. An increase in inventories of wood pulp in the hands

FATS AND OILS
April 1946

Item (Thousands of pounds)	Factory Production		Factory Consumption	
	Apr. 1946	Mar. 1946	Apr. 1946	Mar. 1946
Vegetable Oils				
Cottonseed, crude	50,834	72,347	79,568	87,113
Cottonseed, refined	69,571	77,837	84,414	77,416
Peanut, crude[1]	7,062	7,341	9,105	9,403
Peanut, refined	7,904	7,938	5,511	6,215
Coconut, crude	23,988	17,557	20,334	12,748
Coconut, refined	8,737	3,371	7,758	4,179
Corn, crude	14,564	18,091	16,365	15,648
Corn, refined	14,888	14,376	2,210	2,038
Soybean, crude	125,990	134,747	120,512	127,979
Soybean, refined	112,155	119,199	90,566	88,478
Olive, edible	[2]	313	3	11
Olive, inedible	...	...	33	19
Olive, sulphur oil or olive foots	[2]	[2]	50	39
Palm kernel, crude	...	...	1,680	2,703
Palm kernel, refined	...	[2]	[2]	[2]
Palm, crude	...	...	4,186	4,175
Palm, refined	[2]	[2]	345	423
Babassu, crude	[2]	[2]	4,667	7,026
Babassu, refined	[2]	[2]	3,174	5,345
Rapeseed	...	...	1,403	1,646
Linseed	42,129	40,622	51,297	46,888
China wood or tung	981	1,446	1,720	1,809
Perilla	...	...	6	10
Castor No. 1, crude	7,732	8,512	7,809	7,676
Castor No. 3, crude	2,127	2,383	3,090	2,767
Castor, dehydrated	3,490	3,718	3,491	2,979
Castor, sulphonated	xxx	xxx	491	421
Sesame	...	...	201	73
Oiticica	...	...	1,628	1,515
All other	8,595	11,095	2,333	2,604
Animal Fats				
Lard, rendered, including neutral lard and rendered pork fat	108,998	112,232	1,887	2,594
Tallow, edible	5,637	7,329	6,340	6,863
Tallow, inedible	79,804	88,571	110,614	106,132
Neat's-foot oil	217	253	423	396
Fish and Marine Mammal Oils[3]				
Cod	33	75	1,214	1,300
Cod liver	3	8	1,030	1,096
Other liver	333	299	396	746
Other fish	[4]462	[5]266	11,221	11,545
Marine mammal	...	...	1,070	1,537
Greases				
Greases (including garbage and house), other than wool	46,341	47,641	48,478	48,429
Wool grease	1,567	1,719	1,417	1,583
Secondary Products				
Stearin, vegetable oil, winter	6,860	5,841	6,296	5,212
Stearin, animal, edible	1,361	1,779	1,840	1,825
Stearin, animal, inedible	2,814	3,131	1,425	1,578
Oleo oil	2,227	3,779	655	936
Grease oil and lard oil	4,950	4,983	4,199	3,634
Tallow oil	2,336	3,407	999	1,094
Vegetable oil foots, raw and acidulated soap stock (100% fatty acid content)	18,049	17,047	13,414	11,414
Foots from fish and marine mammal oil (100% basis)	[6]	[6]	520	1,190
Animal foots (100% basis)	2,316	1,920	2,414	2,980
Other fatty acid stock including spent and salvaged oils and fats, tall oil, palm oil, refuse, etc.	15,634	16,351	10,970	11,818
Vegetable oil fatty acids from foots and other than from foots including fatty acids from tall oil, palm oil, refuse, etc.	13,604	14,449	12,371	12,260
Fish and marine mammal fatty acids	3,153	2,962	866	819
Animal fat and oil fatty acids	20,775	23,662	21,354	23,770
Red oil or oleic acid	7,154	7,532	6,372	5,905
Stearic acid	5,601	5,647	4,631	4,427
Other Products				
Glycerin, crude (100% basis)	14,266	14,042	15,159	14,533
Glycerine, high gravity and yellow distilled (100% basis)	5,780	5,373	6,489	6,431
Glycerine, chemically pure (100% basis)	8,000	8,992	5,568	5,777
Hydrogenated oils, edible	82,216	82,793	76,712	75,555
Hydrogenated oils, inedible	13,597	12,417	15,177	15,934
Shortening	113,829	108,434	737	703
Winterized vegetable oils	25,800	22,217	xxx	xxx

[r] Revised.

[1] Data on production collected by Bureau of Agricultural Economics; stocks held by crude peanut oil producers also reported by Bureau of Agricultural Economics, whereas those held at refineries are collected by the Bureau of the Census.

[2] Included in "All other" vegetable oils to avoid disclosures of operation of individual establishments.

[3] Fish and Wildlife Service collected the data from fish oil producers.

[4] Includes 204,000 pounds of menhaden oil. No herring, sardine and pilchard production for April.

[5] Includes 55,000 pounds of herring, sardine, and pilchard. No menhaden oil production reported for March.

[6] Not shown to avoid disclosure of individual operations.

(*Source: Bureau of the Census*)

of paper and paperboard manufacturers of about 21,000 tons was due to the excess of receipts over consumption of imported wood pulp.

Paper and paperboard production in February was 1,438,290 tons, some 71,000 tons less than the January figure, reflecting the shorter working month. However, production for the current month was substantially higher than the 1,332,446 tons reported for February of last year. The production of all grades of paper and paperboard was lower in February, with the exception of container board, which rose to 315,423 tons from the abnormally low figure of 303,522 tons in January.

Guiana Bauxite Exports

Bauxite exports from British Guiana during the last 3 months of 1945 totaled 90,840 long tons, bringing the total for the year to 738,544 tons valued at $3,660,637, compared with 873,968 tons valued at $5,411,976 during 1944.

The following table shows the expansion of bauxite production since the outbreak of war in 1939.

Year	*Long tons*	*Value*
1936	170,153	$1,030,132
1937	300,707	1,719,793
1938	376,368	2,020,275
1939	476,487	2,889,368
1940	624,487	4,023,752
1941	1,072,616	6,986,437
1942	1,116,463	7,215,294
1943	1,901,393	10,899,895
1944	873,968	5,411,976
1945	738,544	3,660,637

Boron Mineral Output Up

Production of boron minerals which has been steadily mounting since the wartime low of 226,723 short tons in 1942, reached 325,935 tons in 1945 to establish an eight-year peak for the industry. Major impetus to productive activities was provided by the reconversion of the refrigerator, washing machine and ceramic industries which provide the major market for borax.

Output for the past few years are listed by the Bureau of Mines as:

	Short tons	*Value*
1941	301,282	$6,785,662
1942	226,723	5,733,648
1943	256,633	6,401,507
1944	277,586	6,579,587
1945	325,935	7,635,365

SUPERPHOSPHATE

In short tons (2000 pounds)

Item — *March 1946*	*Normal 18% APA*	*Concentrated 45% APA*	*Wet-base goods 18% APA*
Stocks on hand, beginning of month	750,642	34,752	10,250
Production	[1]647,919	25,408	5,133
Received from other acidulators (inc. exchange transfers)	[1]18,726	1,286	...
Book adjustments (account of inventory)	+722	....	+1,530
Total suuply	[1]1,418,009	61,446	16,913
Disposition, total	[1]839,401	25,615	12,810
Shipments, total	[1]472,837	24,819	6,563
Used in reporting plants	[1]366,564	796	6,247
Stocks on hand, end of month	[1]578,608	35,831	4,103

[1] Proportion of estimate, 7.5 per cent or less.

WESTERN STATES PHOSPHATE ROCK SOLD OR USED BY PRODUCERS, 1941-45

	Idaho			*Montana*		
		Value at mines			*Value at mines*	
Year	*Long tons*	*Total*	*Average*	*Long tons*	*Total*	*Average*
1941	97,274	$444,154	$4.57	105,108	$318,588	$3.03
1942	114,079	511,249	4.48	119,764	488,665	4.08
1943	108,916	561,630	5.16	150,402	572,464	3.81
1944	112,565	584,400	5.19	186,434	761,745	4.09
1945	123,340	673,627	5.46	150,858	916,288	6.07

	Utah			*Total*		
		Value at mines			*Value at mines*	
Year	*Long tons*	*Total*	*Average*	*Long tons*	*Total*	*Average*
1941	1,340	$8,535	$6.37	203,722	$771,277	$3.79
1942	1,184	7,410	6.26	265,665	1,091,123	4.11
1943	....	....	...	228,680	1,050,295	4.59
1944	....	....	...	298,999	1,346,145	4.50
1945	....	....	...	274,198	1,589,915	5.80

SULFURIC ACID

Production, Consumption, and Stocks, for the United States, 1945
(In short tons, 100% H_2SO_4)

New sulfuric acid production for 1945 amounted to 8,687,070 tons, an increase of 147,693 tons over the previous year. The rise was largely in the Baltimore area where the production was 115,091 tons greater than in 1944. This area with nearly 877,000 tons of new sulfuric acid reported in 1945 advanced from third place in 1944 to first in 1945, replacing the New York area which is now the second largest producer. The Great Lakes area, the second most important in 1944, dropped to third place in 1945.

Statistics on sulfuric acid are compiled from data reported by 177 commercial sulfuric acid plants operating in the United States during 1945. As of December 1945, there were 174 reporting plants, 88 of these producing acid by the contact process and 101 by the chamber process. Fifteen plants reported production by both processes, thus accounting for the apparent duplication in the plant count. During the year three plants producing by the contact process discontinued operations. Data for government-owned plants which are operated by private interests and which serve industrial users are included. However, data for plants owned by the government and operated in conjunction with ordnance works and arsenals are not covered.

Year and Month	*Production* — *Gross production including fortified spent acid*	*New acid* — *Total*	*Contact process*	*Chamber process*	*Spent acid consumed in fortification*	*Consumption at producing plant*	*Stocks on hand at producing plant (end of month)*
1945 *							
United States, Total	9,522,697	8,687,070	5,517,873	3,169,197	835,627	2,141,740	.....
January	853,434	773,244	477,304	295,940	80,190	243,243	262,482
February	805,652	726,596	448,754	277,842	79,056	238,082	264,816
March	859,931	770,975	495,046	275,929	88,956	234,069	242,778
April	834,028	737,853	475,466	262,387	96,175	234,695	230,756
May	868,435	776,737	507,343	269,394	91,698	236,217	238,323
June	822,025	736,152	481,177	254,975	85,873	239,420	226,611
July	841,747	762,266	513,754	*248,512	79,481	230,518	256,453
August	782,594	729,579	468,823	260,756	53,015	247,190	280,390
September	677,053	642,274	393,617	248,657	34,779	238,306	305,911
October	726,291	674,791	417,380	*257,411	51,500	.....	.....
November	705,953	656,404	400,551	255,853	49,549	.....	.....
December	745,554	700,199	438,658	261,541	45,355	.....	.....

* Revised.

(Source: Bureau of the Census)

SALES OF LACQUER

(Including Sales of Package Goods to Jobbers and Dealers)
First Quarter 1946

Data are for sales of 158 identical manufacturers and represent approximately 84 per cent of the total value of nitrocellulose lacquers as reported in the Census of Manufactures, 1939. Comparable figures are available beginning with the third quarter 1934.

Year and Quarter	*Total*		*Clear Lacquers*		*Pigment Lacquers*		*Bases and Dopes*		*Thinners*	
1946	*Gallons*	*Value*	*Gallons*	*Value*	*Gallons*	*Value*	*Gallons*	*Value*	*Gallons*	*Value*
First quarter	14,095,721	$21,530,691	4,118,637	$6,603,679	3,803,679	$8,857,840	914,212	$1,143,057	5,259,193	$4,926,115
1945										
First quarter	14,467,630	21,037,295	3,829,659	6,027,551	3,608,700	8,031,607	894,874	1,174,195	6,134,397	5,803,942
Second quarter	15,030,134	21,907,822	4,090,589	6,446,433	3,530,998	7,912,913	1,062,553	1,492,260	6,345,994	6,056,216
Third quarter	14,625,734	20,909,645	3,928,514	6,136,921	3,449,207	7,629,930	805,943	1,100,661	6,442,070	6,042,133
Fourth quarter	13,063,991	19,752,790	4,087,248	6,472,836	3,391,069	7,680,304	815,643	1,057,594	4,770,031	4,542,056
Total (year)	57,187,489	83,607,552	15,936,010	25,083,741	13,979,974	31,254,754	3,579,013	4,824,710	23,692,492	22,444,347
1944										
First quarter	13,299,357	19,269,573	3,652,379	5,686,251	3,534,862	7,653,841	931,398	1,179,278	5,180,718	4,750,203
Second quarter	12,865,678	18,973,064	3,302,153	5,148,027	3,463,824	7,786,672	859,723	1,105,190	5,239,978	4,933,175
Third quarter	13,641,511	19,948,728	3,408,370	5,454,372	3,613,567	8,082,702	830,343	1,069,401	5,789,231	5,342,253
Fourth quarter	13,634,718	19,916,687	3,503,544	5,372,428	3,637,316	8,074,249	858,057	1,110,086	5,635,801	5,359,924
Total (year)	53,441,264	78,108,052	13,866,446	21,661,078	14,249,569	31,597,464	3,479,521	4,463,955	21,845,728	20,385,555

(Source: Bureau of the Census)

U. S. ROSIN CONSUMPTION

1945-46 Crop Year

(Bbls.—50 gals.)

	Total
Abattoirs	455
Asphaltic products	1,727
Adhesives & plastics	22,656
Automobiles & wagons	109
Chemicals & pharmaceuticals	272,303
Ester gum & synthetic resins	250,835
Foundries & foundry supplies	14,364
Furniture	3
Insecticides & disinfectants	5,407
Linoleum & floor covering	9,602
Matches	1,304
Oils & greases	26,431
Paint, varnish & lacquer	101,240
Paper & paper size	27,022
Printing ink	7,435
Railroads & shipyards	17,747
Rubber	21,234
Shoe polish & shoe materials	5,604
Soap	182,883
Other industries	4,073
Total industrial reported	1,219,234
Not accounted for	35,371
Apparent U. S. consumption	1,254,605

U. S. TURPENTINE CONSUMPTION

1945-46 Crop Year

(Drums—520 lbs.)

	Total
Abattoirs	0
Adhesives & plastics	264
Asphaltic products	0
Automobiles & wagons	161
Chemicals & pharmaceuticals	107,078
Ester gum & synthetic resins	16,945
Foundries & foundry supplies	616
Furniture	164
Insecticides & disinfectants	16
Linoleum & floor covering	36
Matches	0
Oils & greases	72
Paint, varnish & lacquer	17,828
Paper & paper size	0
Printing ink	216
Railroads & shipyards	8,518
Rubber	629
Shoe polish & shoe materials	11,336
Soap	0
Other industries	211
Total industrial reported	164,090
Not accounted for	348,325
Apparent U. S. consumption	512,415

INSECTICIDES PRODUCTION

(In pounds)

Commodity	1944	1945	Percentage of increase or decrease
Calcium arsenate	44,352,000	[1]27,000,000	[2]–39
Lead arsenate	90,080,000	71,192,000	[3]–21
Paris green	3,270,000	[4]4,000,000	+22
Copper sulfate	205,330,000	250,000,000	+22
DDT	9,454,000	33,000,000	+249
Pyrethrum[5]	10,658,000	18,270,000	+71
Rotenone[5]	6,327,000	8,770,000	+39

[1] Estimated (December 1945 figures unavailable).
[2] Planned decrease because of large carryover; all demands were met.
[3] Imports.
[4] Source: Chemicals and Drugs Section, Office of Domestic Commerce.

NITRIC ACID

U. S. Production

(Short tons 100% HNO_3)

Year	Total production	Made and consumed in producing plants	Made for Sale: Quantity	Made for Sale: Value
1931	117,240	85,819	31,421	$3,381,554
1933	95,637	66,056	29,581	2,428,268
1935	96,109	71,609	24,500	2,142,817
1937	175,860	140,450	35,410	3,052,576
1939	167,740	133,169	34,571	3,184,912
1941[1]	347,360	289,847	57,513	(2)
1942[1]	428,624	343,451	85,173	(2)
1943[1]	485,248	395,990	89,258	(2)
1944[1]	471,717	413,201	58,516	(2)

[1] Total production is comparable for all years. However, consumption in producing plants (column 3) for 1941-44 is not strictly comparable with earlier years since the figures for 1941-44 include purchased and transferred material, while those for 1931-39 are only for material consumed in the plant where produced. The quantity made for sale for 1941-44 (column 4) was computed by difference between columns 2 and 3 and also is not strictly comparable with figures for previous years.
[2] Not available.

IRON OXIDE PIGMENT SALES—1945

Pigment	Short tons	Value
Mineral blacks	2,960	$61,388
Precipitated magnetic blacks	[1]	[1]
Natural brown oxides (metallic browns)	6,569	290,011
Vandyke brown (finished pigment)	284	52,084
Sap brown		
Pure brown (96 per cent or better iron oxides)	[1]	[1]
Natural red oxides	18,051	714,856
Pure red oxides (98 per cent or better Fe_2O_3)	13,347	2,457,565
Venetian reds	8,954	650,815
Pyrite cinder	679	42,545
Other red iron oxides	11,064	1,050,695
Natural yellow oxides (high Fe_2O_3)	[1]	[1]
Pure yellows (85 per cent or better Fe_2O_3)	14,060	1,913,609
Ochers (low Fe_2O_3)	11,018	361,441
Siennas:		
Burnt	853	109,498
Not burnt	2,563	306,621
Umbers:		
Burnt	2,685	232,899
Not burnt	[1]	[1]
Other	7,927	581,147
	101,014	8,825,174

[1] Included under "Other."

GELATIN

April 1946

Production, Shipments and Stocks

(Pounds)

Item	1946 April	1946 March
Production		
Gelatin, total	3,783,622	3,919,133
Edible	2,318,396	2,540,822
Technical	217,802	142,956
Pharmaceutical	456,452	279,983
Photographic	790,972	955,372
Shipments		
Gelatin, total	3,823,679	3,417,771
Edible	2,391,734	2,273,979
Technical	211,189	158,415
Pharmaceutical	364,429	279,986
Photographic	856,327	705,391
Stocks (End of Month)		
Gelatin, total	6,113,703	6,129,909
Edible	2,713,591	2,759,880
Technical	121,685	115,034
Pharmaceutical	399,054	307,031
Photographic	2,879,373	2,947,964

(Source: Bureau of Census)

Earnings of Chemical Workers Up

Weekly earnings of factory workers in chemical and related fields showed a slight gain in March, as compared with February. A breakdown of the weekly earnings for the chemical and allied industries follows:—

Average Earnings

	Weekly: Mar., 1946	Weekly: Feb., 1946	Weekly: Jan., 1946
Chemical and allied products	$43.29	$42.73	$42.61
Ammunition	44.01	43.97	42.89
Chemicals	51.14	50.60	50.66
Cottonseed oil	29.73	29.26	29.76
Drugs, medicines, insecticides	38.35	37.64	36.28
Explosives, safety fuses	47.98	47.25	46.96
Fertilizers	31.93	30.68	29.88
Paints and varnishes	45.89	45.49	45.17
Petroleum refining	....	....	....
Rayon, allied products	39.53	39.13	39.23
Soaps	46.43	46.76	48.17

Coal Tar Chemical Imports

The United States Tariff Commission has issued a report recently on United States imports of coal-tar products entered in 1945 under paragraphs 27 and 28 of the Tariff Act of 1930. The report gives statistics on coal-tar intermediates entered under paragraph 27 and on dyes, medicinals and pharmaceuticals, flavor and perfume materials, and other finished products entered under paragraph 28.

According to the Commission report total imports in 1945 of coal-tar intermediates amounted to 703,000 pounds, valued at $215,000—much smaller than in 1944 when they amounted to 9 million pounds, valued at 1.4 million dollars.

Total imports in 1945 of finished coal-tar products amounted to 27 million pounds, valued at 4.9 million dollars. Corresponding imports in 1944 amounted to 5 million pounds valued at 3.4 million dollars. In both years, dyes constituted by far the most important group of imported finished coal-tar products.

PLASTICS & SYNTHETIC RESINS

Shipments and Consumption (In pounds)

Item	February 1946
Cellulose acetate and mixed ester plastics:[1]	
Sheets:	
Continuous (under .003 gauge)	596,355
Continuous (.003 gauge and upward)	541,542
All other sheets, rods and tubes	410,867
Molding and extrusion materials	6,024,690
Nitrocellulose plastics:[1]	
Sheets	822,120
Rods and tubes	613,116
Phenolic and other tar acid resins:	
Laminating (dry basis)	1,806,919
Adhesives (dry basis)	991,233
Molding materials[1]	10,606,487
All other (dry basis)[2]	4,331,994
Urea and melamine resins:	
Adhesives (dry basis)	2,794,506
Textile and paper treating (dry basis)	995,776
All other (dry basis)[2]	167,559
Polystyrene	3,007,122
Vinyl resins:	
Sheeting and film[1]	1,665,666
Textile and paper coating resins (resin content)	1,034,511
Molding and extrusion materials[1]	5,910,429
Adhesives (resin content)	399,600
All other (resin content)[2]	589,224
Miscellaneous plastics and resins:	
Molding and extrusion materials[1 2]	4,498,719
All other (dry basis)[2 4]	2,612,440

[1] Includes fillers, plasticizers and extenders.
[2] Excludes data for protective coating resins.
[3] Includes data for ethyl cellulose, urea and melamine, acrylic acid and miscellaneous molding and extrusion materials.
[4] Includes data for petroleum resins, acrylic acid ester resins, mixtures and miscellaneous synthetic resin materials.

Zinc Scrap Consumption Up

Consumption of zinc scrap, which had fallen 18 percent in February, increased 25 percent to 17,051 short tons in March, according to the Bureau of Mines. Receipts were in balance with consumption so that consumers' total stocks remained virtually unchanged. March secondary zinc recovery was 12,027 tons.

The most important March increases in consumption were 1,111 tons or 43 percent in skimmings and ashes, 859 tons or 29 percent in galvanizers' dross, and 483 tons or 29 percent in sal skimmings.

Increases in recovery of zinc from scrap were recorded in all important items in March, the largest being 779 tons in lead-free zinc oxide.

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Grade	633½	634½	638½	639½
Sp. Gr. (60° F)	0.9958	0.9979	1.020	1.021
Flash °F	450	460	510	520
Pour °F	35	40	70	75
Viscosity 210° F, Saybolt sec.	110	125	510	720
Viscosity Index	—109	—130	—365	—400
Distn. (1 mm) °F				
5%	405	409	498	506
30%	442	445	540	559
Evapn. Loss mg/10g. (1 hr. oven 100° C)	5	5	3	2

These products are dark colored and composed mainly of high-boiling aromatic hydrocarbons differing substantially from coal tar products of corresponding boiling range.

Their utility in rubber and synthetic rubber compounding is well established. They are not completely compatible in vinyl chloride compounds, but their use in other composition requiring a low-cost plasticizer, or as a saturant for fibrous products, is indicated.

Bulletins 13 and 13A describe the use of INDONEX in synthetic and natural rubber compounds. Samples available on request.

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Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
June, 1944, $0.890 *June, 1945, $0.870*
June, 1946, $0.818

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Acetaldehyde, 99%, drs. wks. lb.	.11	.14	.11	.14	.11	.14
Acetic Anhydride, drs, ... lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv. ..... lb.	.06	.07	.06	.07	.06	.07
ACIDS						
Acetic, 28%, bbls ....100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls. .....100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks. .....100 lbs.	6.93	7.25	6.93	7.25	6.93	7.25
Acetylsalicylic, Standard USP ..... lb.	.40	.54	.40	.54	.40	.54
Benzoic, tech. bbls. ..... lb.	.43	.47	.43	.47	.43	.47
USP, bbls, 4,000 lbs. up lb.	...	.54	...	.54	...	.54
Boric tech, bbls. c-l. tons *a*	...	109.00	...	109.00	...	109.00
Chlorosulfonic, drs, wks. .. lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls. ..... lb. *b*	.20	.21	.20	.21	.20	.21
Cresylic 50%, 210-215° HB, drs. wks. frt. equal gal.	.81	.96	.81	.96	.81	.83
Formic, 85%-90% cbys. lb.	.10	.11½	.10	.11½	.10	.11½
Hydrofluoric, 30% rubber, dms. ..... lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks .. lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs ... lb.	.25	.26	.25	.26	.25	.26
Muriatic 18° cbys ....100 lb.	1.50	2.45	1.50	2.45	1.50	2.45
20° cbys, c-l, wks. ..100 lb.	...	1.75	...	1.75	...	1.75
22° cbys, c-l, wks. ..100 lb.	...	2.25	...	2.25	...	2.25
Nitric, 36°, cbys, wks 100 lbs. *c*	5.00	5.25	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	...	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	...	6.50
Oxalic, bbls, wks ..... lb.	.11¼	.12½	.11¼	.12½	.11¼	.12½
Phosphoric, 100 lb. cbys, USP ..... lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic tech, bbls ..... lb.	.26	.42	.26	.42	.26	.42
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...	13.00
66°, tks, wks .....ton	...	16.50	...	16.50	...	16.50
Fuming 20% tks, wks. .ton	...	19.50	...	19.50	...	19.50
Tartaric, USP, bbls ..... lb.	.62½	.63	.62½	.71	.70½	.71
Alcohol, Amyl (from Pentane) tks, delv ..... lb.	...	.131	...	.131	...	.131
Butyl, normal, syn, tks lb.	...	.10¾	...	.10¾	...	.10¾
Denatured, CD 14, c-l drs ..... gal. *d*	...	.613	...	.613	...	.59
Denatured, SD, No. 1, tks. *d*	...	.542	...	.542	...	.52
Ethyl, 190 proof tks...gal.	...	17.65½	...	17.65½	...	17.60
Isobutyl, ref'd, drs .... lb.	...	.0660	...	.0660	...	.086
Isopropyl ref'd, 91%, dms ..... gal.	.38	.41	.38	.41	.37½	.66½
Alum, ammonia, lump, bbls, wks .....100 lb.	...	4.25	...	4.25	...	4.25
Aluminum, 98-99% ...100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd l.c.l. wks lb.	.09	.12	.09	.12	.08	.12
Hydrate, light, bgs. .... lb.	...	.14½	...	.14½	.14½	.15
Sulfate, com'l. bgs, wks, c-l ..... 100 lb.	1.15	1.20	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs, wks .....100 lb.	1.75	2.00	1.75	2.00	1.75	2.10
Ammonia anhyd, cyl .... lb.	...	.14½	...	.14½	...	.14½
Ammonia, anhyd. fert. tank cars, wks. frt. equalized ton	...	59.00	...	59.00	...	59.00
Ammonium Carbonate, USP, lumps, dms ... lb.	.08¼	.09½	.08¼	.09½	.08¼	.09¼
Chloride, whi, bbls, wks, 100 lb.	4.45	5.15	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks. lb.	.0435	.0450	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls. lb.	...	.23	...	.23	.27	.33
Perchlorate, kgs ..... lb.	no stocks		no stocks		no stocks	
Phosphate, dibasic tech. bgs ..... lb.	.07	.07¼	.07	.07¼	.07	.08½
Stearate, anhyd. dms.... lb.		.34		.34		.34
Sulfate, dms, bulk ....ton	28.20	29.20	28.20	29.20	28.20	29.20
Amyl Acetate (from pentane) tks., delv. ..... lb.	...	.14½	...	.14½	...	.15½
Aniline, Oil, drs ..... lb.	.11½	.12½	.11½	.12½	.11½	.12½
Anthraquinone, sub, bbls.. lb.	...	.70	...	.70	...	.70
Antimony Oxide, bgs ... lb.	.16	.17	.15	.17	.15	.16
Arsenic, whi, kgs—powd. lb.	.04	.04¾	.04	.04¾	.04	.04¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher.

		Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Barium Carbonate precip, wks, bgs.	ton	60.00	75.00	60.00	75.00	60.00	75.00
Chloride, tech, cyst, bgs, zone 1	ton	73.00	78.00	73.00	78.00	73.00	78.00
Barytes, floated, bbls.	ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines	ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms	lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, ft all'd	gal.	...	.15	...	.15	...	.15
Benzyl Chloride, cbys	lb.	.20	.21	.20	.24	.22	.24
Beta-Naphthol, tech, bbls, wks	ton	.21	.23	.21	.24	.23	.24
Bismuth metal, ton lots	lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks	ton h	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks,100 lb.		2.50	3.10	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs	ton i	...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs	lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases	lb.	.21	.23	.21	.23	.21	.30
Butyl, acetate, norm. drs	lb.	.2035	.2085	.1860	.2155	17.90	19.45
Cadmium Metal	lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs, 100 lb.		3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs	ton	50.00	90.00	50.00	90.00	50.00	95.00
Carbonate, c-l bgs	ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l	ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l,	ton	18.00	34.50	18.00	34.50	18.00	34.00
Cy'n'd, min. 21% N, c.l.	lb.	.02¼	.02¾	...	...	...	...
Gluconate, U.S.P., drs.	lb.	.57	.59	.57	.59	.57	.59
Phosphate, tri, bbls, cl	lb.	...	.0635	...	.0635	...	.0635
Camphor, U.S.P., gran, powd, bbls	lb.	.69	.71	.69	.71	.69	.71
Carbon Bisulfide, 55-gal drs	lb.	.05	.05¼	.05	.05¼	.05	.05¼
Dioxide, cyl	lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms	gal.	.69	.76	.69	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more	lb.	...	.33	.24	.33	...	.24
Chlorine, cyls, lcl, wks, contract	lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract	lb. j	...	.05¼	...	.05¼	...	.05¼
Liq. tk, wks, contract 100 lb.		...	1.75	...	1.75	...	1.75
Chloroform, tech, drs	lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude	bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt, Acetate, bbl	lb.	...	.83¼	...	.83¾	...	.83¾
Oxide, black kgs	lb.	...	1.84	...	1.84	...	1.84
Copper, metal	100 lb.	...	14.37	12.00	14.37	12.00	12.50
Carbonate, 52-54%, bbls.	lb.	.19½	.20½	.19½	.20½	.19½	.20½
Sulfate, bgs, wks cryst.	100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks	ton	...	14.00	...	14.00	...	14.00
Cresol, USP, drs	lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Dibutylamine, c-l, drs, wks,		...	.66	...	.66	...	.66
Dibutylphthalate, drs	lb.	.1700	.2359	.1700	.2359	.1770	.2359
Diethylaniline, lb drs	lb.		.40	...	.40	...	.40
Diethyleneglycol, drs, wks	lb.	.14	.15	.14	.15	.14	.15½
Dimethylaniline, dms,cl.,lcl	lb.	.21	.22	.21	.22	.23	.24
Dimethyl phthalate, drs	lb.	.20	.20½	.20	.20½	.20	.20½
Dinitrobenzene, bbls	lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms.	lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls	lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms	lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks.	lb.	.16	.20	.16	.20	.16	.20
Diphenylamine bbls	lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs	lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate, tks, frt all'd	lb.	...	.1175	.0950	.1175	.0975	.1175
Chloride, drs	lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms	lb.	.0891	.0941	.0842	.0941	.0842	.0941
Glycol, dms, cl.	lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd.95-98% bulk, cl-mines	ton	...	37.00	...	37.00	...	37.00
Formaldehyde, bbls, cl & lcl	lb.	.0520	.0570	.0520	.0570	.0520	.0570
Furfural tech, dms, c-l,wks	lb.	...	.13	...	.13	...	.13
Fusel Oil, ref'd, dms, dlvd	lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, Cryst, c-l. bgs, bbls, wks	100 lb.	1.05	1.45	1.05	1.45	1.05	1.45
Glycerine dynamite, dms, c-l,	lb.	.17½	.18¾	.17½	.18¾	...	.16½
Crude Saponification, 80% to refiners tks	lbs.	...	.11½	...	.11	.09½	.11½

GUMS

Gum Arabic, amber sorts bgs		.14¼	.14¾	.11¾	.14¾	.11	.13
	lb.	1.75	2.55	.52	1.00	.52	1.00
Benzoin, artificial, cns.	lb.	...	no stocks	...	.55¾	...	.55¾
Copal, Congo	lb.	...	no stocks	...	.55¾	...	.55¾
Copal, East India, chips	lb.	...	no stocks	...	.07⅜	...	.07⅜
Macassar dust	lb.	...	no stocks	.13½	.15½	.13½	.15½
Copal Manila,		...	no stocks	...	.17⅜	...	.23⅜
Copal Pontianak, bold c-l	lb.	.21	.50	.18	.50	.15	.46
Karaya, bbls, bxs, dms.	lb.						

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

AHCO PRODUCTS

METHYL "CELLOSOLVE"* STEARATE

METHYL "CELLOSOLVE" STEARATE, a synthetic ester, is used as a plasticizer for cellulose derivative, paper coatings and wax finishes. The following data may suggest other uses.

Chemical formula, $C_{17}H_{35}COOCH_2CH_2OCH_3$
Molecular weight 342
Color (platinum cobalt scale) 175
Melting point ..... 22° to 24°C
Flash point ..... 378°F
Acidity, less than .6 mg. KOH per gram ester
Specific gravity ..... .888 at 25°/25°C
Iodine value ..... 2 max.

Low volatility

* Trade mark of C&CCC

★

BUTYL STEARATE

BUTYL STEARATE, a synthetic ester, is used as a plasticizer for cellulose and polyvinyl derivatives, also for cosmetics, paper coatings and wax finishes. The following data may suggest other uses.

Chemical formula ..... $C_{17}H_{35}COOC_4H_9$
Molecular weight 341
Color (platinum cobalt scale) 130
Melting point ..... 19° to 20°C
Flash point ..... 358°F
Acidity, less than .6 mg. KOH per gram ester
Saponication number, 171-179 mg. KOH per gram ester
Specific gravity ..... .85-.86 at 20°/20°C
Iodine value ..... 2 max.

Low volatility

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ONE OF AMERICA'S GREAT BASIC BUSINESSES

Current Prices

Gums
Salt Lake

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Kauri, N. Y.						
Superior Pale XXX ... lb.	...	nom.	...	.65¾	...	.65¾
No. 3 ... lb.	...	nom.	...	.22	...	.22
Sandarac, cs ... lb.	...	nom.	.97½	.99½	...	.99½
Tragacanth, No. 1, cases .. lb.	4.25	4.30	3.75	4.30	3.80	5.00
No. 3 ... lb.	2.75	2.80	2.10	2.80	2.15	3.00
Yacca, bgs ... lb.	...	nom.	.05	.07¼	.06	.07¾
Hydrogen Peroxide, cbys .. lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars .. lb.	1.75	1.85	1.75	1.85	1.75	2.10
Lead Acetate, cryst, bbls .. lb.	...	.12½	...	.12½	...	.12½
Arsenate basic, bg, lcl . lb.	.12	.12½	...	.12	.11½	.12
Nitrate, bbls. ... lb.	...	.12½	...	.12½	...	.12½
Red, dry, 95% Pb_3O_4 bbls. ... lb.	.11½	.13½	.09	.13¼	.09	.10¾
97% Pb_3O_4, bbls delv. lb.	.12	.13¾	.09½	.13¾	.09½	.11½
98% Pb_3O_4, bbls delv. lb.	.09¾	.10¼	.08¼	.10¼	.08¼	.08¾
White, bbls ... lb.	.08¾	.09½	.07¼	.09½	.07¼	.08
Basic sulfate, bbls, lcl lb.	.07¾	.08	.07¾	.08	.07¾	.08
Lime, Chem., wks, bulk .. ton	6.50	9.25	6.50	9.25	6.25	13.00
Hydrated, f.o.b. wks .. ton	8.50	12.00	8.50	12.00	8.50	16.00
Litharge, coml, delv. bbls .. lb.	.08	.09¾	.08	.09¾	.08	.09¾
Lithopone, ordi., bgs .... lb.	.04¾	.04½	.04¾	.04¾	.04¾	.04¾
Magnesium Carb, tech, wks lb.	.07¼	.10¾	.07¾	.10¾	.06¾	.10¾
Chloride flake, bbls, wks c-l ... ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, Anhyd. bbls. ... lb.	.14	.16	.14	.18	.15	.18
Dioxide, Caucasian bgs, lcl ... ton	74.75	79.75	74.75	79.75	74.00	79.75
Methanol, pure, nat, drs gal *l*	.63	.73	.63	.73	.63	.76
Synth, drs cl ... gal. *m*	.31	.38	.24	.38	.31	.38
Methyl Acetate, tech tks . lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, cyl ... lb.	.32	.36	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks ... gal.	...	.27	...	.27	...	.27
Naphthalene, crude, 74°, wks tks ... lb.	...	.0275	...	.0275	...	.0275
Nickel Salt, bbls, NY .... lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk ... ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks ... lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls ... lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs ... lb.	.25	.27	.25	.27	.25	.27
Orthodichlorobenzene, drms lb.	.07	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks ... lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, dms lb.	...	.09	...	.09	...	.09
Paraldehyde, 98%, wks lcl ... lb.	...	.12	...	.12	...	.12
Chlorophenol, drs ... lb.	.24	.27	.24	.27	.25	.32
Dichlorobenzene, wks ... lb.	.11	.15	.11	.15	.11	.15
Formaldehyde, drs, wks lb.	.21	.22	.21	.22	.21	.22
Nitroaniline, wks, kgs ... lb.	.41	.43	.41	.45	.43	.45
Nitrochlorobenzene, wks lb.	...	.15	...	.15	...	.15
Toluenesulfonamide, bbls lb.	...	.70	...	.70	...	.70
Toluidine, bbls, wks ... lb.	...	.48	...	.48	...	.48
Penicillin, ampules per 100,00 units ...	.60	.75	.55	.95	.59	2.40
Pentaerythritol, tech ... lb.	.27	.31	.27	.31	.27	.33

PETROLEUM SOLVENTS AND DILUENTS

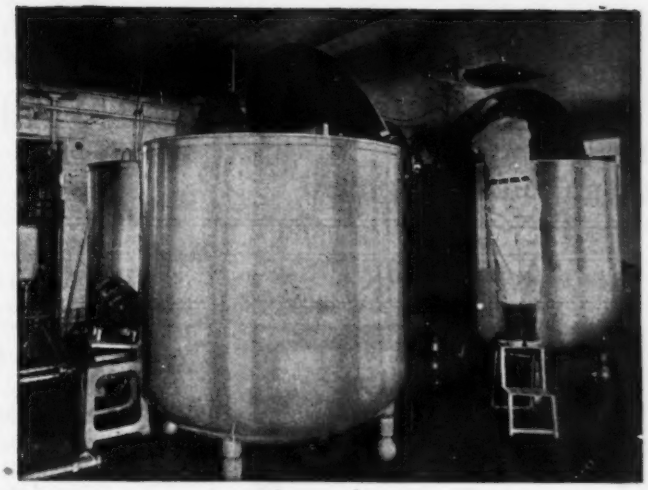
Lacquer diluents, tks, East Coast ... gal.	...	.11½	...	.11½	...	.11
Naphtha, V.M.P., East tks, wks ... gal.	...	.11	...	.11	...	.11
Rubber solvents, East, tks, wks ... gal.	...	.11	...	.11	...	.11
Stoddard Solvents, East, tks, wks ... gal.	...	.10	...	.10	...	.10

Phenol, U.S.P., drs ... lb.	.10½	.11¼	.10½	.11¼	.10½	.11¼
Phthalic Anhydride, cl and lcl, wks ... lb.	.13	.14	.13	.14	.13	.14
Potash, Caustics, 88-92%, wks, sol. ... lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
Flake, 88-92% ... lb.	.07¼	.07½	.07	.07½	.07	.07½
liquid, 45% basis, tks lb.	...	.02¾	...	.02¾	...	.0275
dms, wks ... lb.	.03¼	.03½	.03	.03½	.03	.03½
Carbonate, hydrated 83-85% ... lb.	...	.05½	...	.05½	.05½	.05¾
Chlorate crys, bgs, wks lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs ... lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks ... lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans ... lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriatic dom, 60-62-63% K_2O bulk unit-ton ... ton	...	.53½	...	.53½	.53½	.56
Permanganate, USP, wks dms ... lb.	.20½	.21	.20½	.21	.20½	.21
Sulfate, 90%, basis, bgs ton	...	36.25	...	36.25	...	36.25
Propane, group 3, tks .... gal.	...	.03¾	...	.03¾	...	.03¾
Pyridine, ref., drms .... lb.	.45	.45½	.45	.45½	.45½	.46
R Salt, 250 lb bbls, wks lb.	...	.65	...	.65	...	.65
Resorcinol, tech, drms, wks lb.	.64	.74	.64	.74	.64	.75
Rochelle Salt, cryst ... lb.	.38½	.42	.38½	.47	.43½	.47
Salt Cake, dom, blk wks .. ton	...	15.00	...	15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.
* Spot price is ½c higher.

		Current		1946		1945	
		Low	High	Low	High	Low	High
Saltpeter, grn, bbls.	100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls.	lb. r	.42½	.46	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots							
2,500-oz. lots	oz.	.47	.47¾	.47	.47¾	.47	.47¾
Soda Ash, 58% dense, bgs,							
c-l, wks	100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl.	100 lb.	1.05	1.18	1.05	1.18	1.05	1.13
Caustic, 76% flake							
drms, cl	100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms,cl	100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers,							
tks	100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, anhyd.							
dms	lb.	.08½	.10	.08½	.10	.08½	.10
Benzoate, USP dms	lb.	.46	.52	.46	.52	.46	.52
Bicarb, tech., bgs., cl.,							
works	100 lb.	1.55	1.90	1.55	1.90	1.55	1.90
Bichromate, bgs,wks l.c.l.	lb.	.07⅞	.08¼	.07⅞	.08⅛	.07½	.08⅛
Bisulfate powd, bbls,							
wks	100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35° bbls., wks	100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks c.l.	lb.	...	.06½	...	.06¼	...	.06¼
Cyanide, 96-98%, wks	lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks	lb.	.07¼	.08¾	.07¾	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl,							
wks	100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks							
c-l	lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs	ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% bbl. cl.	lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di anhyd. bgs.							
wks.	100 lb.	6.00	6.75	6.00	6.75	6.00	7.25
Tri-bgs, cryst, wks	100 lb.	2.70	3.10	2.70	3.10	2.70	3.45
Prussiate, yel, bbls. wks	lb.	...	.11	...	.11	...	.11
Silicate, 52°, drs, wks	100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l	100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY	lb.	.06½	.07½	.06½	.10	.06½	.10
Sulfate tech, Anhyd,							
bgs	100 lb.	1.70	2.20	1.70	2.20	1.70	2.20
Sulfide, cryst c-l, bbls,							
wks	100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks	lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl,							
bgs	100 lb.	...	4.08	...	4.08	...	4.08
Potato, bgs, cl	lb.	.16	.16¼	.16	.16¼	...	.0637
Rice, bgs	lb.	no stocks		no stocks		no stocks	
Sweet Potato, bgs	lb.	no stocks		no stocks		no stocks	
Sulfur, crude, mines	ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls,							
kgs	lb.	.18	.30	.18	.30	.18	.30
Roll, bbls	100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl	lb.	.07	.08	.07	.08	.07	.09
tks, wks	lb.	...	.04	...	.04	...	.04
Talc, crude, c-l, NY	ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY	ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks.	lb.	no stocks		no stocks		no stocks	
Metal	lb.	...	.52	...	.52	...	.52
Toluol, drs, wks	gal.	...	.32	...	.32	...	.33
tks, frt all'd	gal.	...	.27	...	.27	...	.28
Tributyl Phosphate, dms lcl,							
frt all'd	lb.	...	.49	...	.49	...	.47
Trichloroethylene,dms,wks	lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate tks	lb.	...	.24	...	.24	...	.24
Triethylene glycol, dms.	lb.	.18½	.19½	.18½	.19½	.18½	.19½
Triphenyl Phos, bbls	lb.	.31	.32	.26	.32	.26	.31
Urea, pure, cases	lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs	lb.	no stocks		no stocks		no stocks	
Bees, bleached, cakes	lb.	.68	.70	.60	.70	no-stocks	
Candelilla, bgs crude	lb.	.75	.78	.62	.78	.35	.36
Carnauba No. 1, yellow,							
bgs, ton	lb.	1.88	1.90	1.80	1.95	no stocks	
Xylol, Indus. frt all'd, tks,							
wks	gal.	...	.26	...	.26	...	.27
Zinc Chloride tech fused,							
wks	lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks	lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs.	100 lb.	3.40	4.15	3.40	4.15	3.40	4.15
OILS AND FATS							
Babassu, tks, futures	lb.	...	.12	.11	.12	...	.111
Castor, No. 3, bbls	lb.	.13¾	.15½	.13¾	.15½	.13¾	.14¼
China Wood, drs, spot NY	lb.	.39	.41	.39	.41	.39	.41
Coconut, edible, drs NY	lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms.	gal.	.88	.90	.88	.90	.85	.90
Corn, crude, tks, wks	lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l	lb.	...	.1550	...	.1550	...	.1550
Menhaden, tks	...	...	.1225	...	.1225	...	.1225
Light, pressed, drs l.c.l	lb.	...	.1300	...	.1300	...	.1300
Palm, Niger, dms	lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b.							
wks	lb.	.12⅞	.13⅛	.12⅞	.13⅛	.12⅞	.13⅛
Perilla, crude dms, NY	lb.	no stocks		no stocks		no stocks	
Rapeseed, New Orleans,							
bulks	lb.	...	.13	...	.13	...	.156½
Red, dms	lb.	.13¼	.14¼	.13¼	.14¼	.12¼	.14¼
Soy Bean, crude, tks, wks	lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls	lb.	...	.14¼	...	.14¾	...	.14¼

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y., refined 6c higher in each case.



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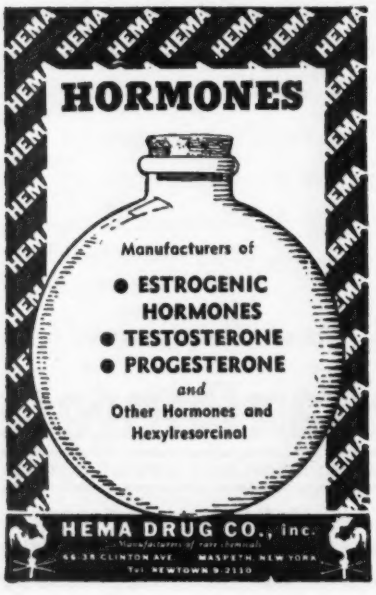

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1—Baker Perkins Stainless Steel Mixer, size 16, type 1V, Class B-8, 150-gals.
1—Baker Perkins Mixer, size 18, type 1V, Class BS, 300-gals.
1—Baker Perkins Jacketed Mixer, 2000-gals.
1—Baker Perkins Jacketed Mixer, 100-gals.
75—Aluminum Rubber-Lined Tanks, 461-gals.
13—Sharples Super Pressurite Centrifuges, 3 HP Explosion-Proof Motors.
1—Edge Moore Iron Works Jacketed Kettle, anchor-type Agitator, 3'8" x 4'11½", approx. 475-gals.

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1—Jewell Copper Water Still 250 GPH.
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3—Evaporators, Double, Triple, Quadruple Effect, details on request.
17—Bucket Elevators, 12' to 50' high, steel housing, motor driven
1—Battery of 2 Tolhurst 40" Suspended Type Centrifugals, 15HP motor driven
1—Buflovak 24" x 20" Vacuum Drum Dryer
1—Dia 5' Copper Jacketed, Agitated Kettle
8—Powder Mixers, 1000 to 3000 lb.
1—16" Troughing Belt Conveyor, 175'
1—American 6' dia. 2 Disc Rotary Filter
1—FEINC 3' x 2' Steel Rotary Vacuum Filter
8—Sperry, Shriver Cast Iron Filter Presses, 12" to 36" square
2—6' x 27'5" Rotary Steam Tube Dryers
4—Rotary Vacuum Dryers, 1½' x 3½', 4' x 12', 4' x 15', 5' x 33'
3—Model 15H Mikro Pulverizers, with 5 HP motors
6—Oliver 8' x 6' Stainless Steel Rotary Continuous Filters. NEW.
2—5' x 6', 5' x 12' Atmospheric Drum Dryers
5—Copper Vacuum Pans, to 6' dia.
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1—Hardinge Mill 4½' x 24", manganese lined.
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New Syphon Fillers.
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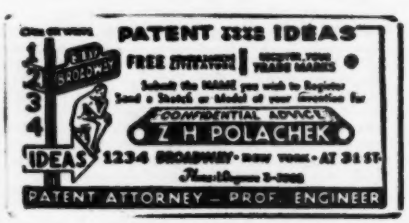

Investigate Novel Bacterium Culture

A German-developed bacterium culture, previously unknown in America, was presented to the Georgetown University School of Medicine by Julius Alsberg, chief of the Chemicals Unit, Technical Industrial Intelligence Branch, Department of Commerce. Dr. Alsberg brought the culture from Germany by plane.

The new bacteria strain will be useful in detecting types of streptococci infections and in testing p-aminobenzoic acid and other vitamins. It may also have practical application in the production of streptomycin.

Zircon Data Available

Prior to an investigation of the use of zircon sand as a raw material for making zirconium metal and alloys, the Bureau of Mines has released a publication combining the most useful information on the metallurgy of corrosive-resistant zirconium metal and describing its extraction, production, alloys and compounds, and various uses.

The Bureau's current report, compiled from numerous patents and publications, and containing a bibliography of more than 200 reference works, is intended as an aid to the industry in the commercial development of zirconium, and is available without charge upon request.

Novel Insecticides Used by Russians

Among the insecticidal preparations developed and utilized by the Russians during the war, primary attention was paid to bisethylxantogen, chlorinated turpentine, and diphenylamine.

The first mentioned was used in combination with soap, as a lousicidal agent, and the chlorinated turpentine was used as a talc dust for the same purpose. Diphenylamine, too, was employed as a toxic ingredient in talc dusting powders.

In the field of insect repellents eugenol was a major base, but to impregnate clothing against ticks and flying insects a preparation known as 8502 was utilized. It consisted of 25 per cent tetrachlorphenol, 25 per cent para-oxychlordiphenyl, and 50 per cent emulsifier. Anabasine sulfate, a plant derivative, was also regarded favorably as an insect repellent.

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"WE" – EDITORIALLY SPEAKING

The following item is the work of Dr. L. J. Teply, of Columbia University. It was not written for publication, but we are presenting it as a service for those of you who have not had the opportunity of attending a scientific meeting.—EDITOR.

THERE ARE THOSE, I understand, who have gone to as many as 25 scientific conventions without attending a single meeting. I suppose we may assume that from time to time these people wonder what they are missing,

Here are the highlights of a round-table symposium at a recent convention. The subject under discussion was "Should a Recommendation Be Made That Laboratories Provide at Least One Drinking Fountain for Every Eight Chemists?"

* * *

CHAIRMAN: And now if we can come to order we shall proceed with our program. Ah—er—we are fortunate indeed in having obtained an outstanding authority to favor us with a discussion. (*The P. A. system is readjusted for the sixth time.*) After the opening remarks we expect a lively discussion from the floor. Oh, I have an announcement here: Will Dr. Bellbottom call Mrs. Bellbottom. (*Everyone cranes his neck to see confused, reddening Bellbottom stumble out of the room.*) As I was saying, oh, yes, the alumni of Spearfish Normal will have a social hour after the meeting. And now may I present our main speaker, Dr. Erlen Argon! (*Scattered applause*)

DR. ARGON: I am sorry to say that I am quite unprepared. However, my only hope is to stimulate discussion from the floor, as I know there are many present who know much more about this subject than I do. There are several questions we might ask. First, assuming that chemists drink water during working hours, how much and how often do they drink? Second, how many fountains are necessary from the quantity and frequency standpoints? I do not propose to answer these fundamental questions but I am sure that the discussion later will prove enlightening.

Now I would like to show some slides giving the results of an impartial survey conducted in several laboratories selected at random. You might be interested in how the sample was selected. A blindfolded three-year-old boy, not related to any chemist, stuck pins in a list of laboratories compiled by the AAAS.

(*After several impatient taps with a wand—five, to be exact, at ten-second intervals—the lights are lowered. The projector is lit after some difficulty about the plug and adjusted to a reasonably sharp focus. During the next few minutes the following events ensue:*

1. *The second slide is shown instead of No.* 1.
2. *Someone kicks out the cord as he goes out for a drink of water.*
3. *Slide No.* 1 *is found and projected successively in the following positions:*
   - *a) reversed*
   - *b) upside-down*
   - *c) reversed and upside-down*
   - *d) out of focus*

This sort of thing never fails to amuse chemists, and it has been said anonymously that it is sometimes done deliberately in order to "pep up the meeting."

When the slide is finally brought into focus, it is as easy to read as the fine print on a Railway Express receipt at twenty paces. (The last fifteen rows adjourn to the bar.)

DR. ARGON: Can everyone see the figures? The slide is self-explanatory, but perhaps I'd better read the figures. (*Three men faint of suffocation and the projector operator burns his hand.*) Well, I think I'll turn the meeting over to general discussion.

CHAIRMAN: Now I'm sure that there are many of you who would like to make comments. Raise your hands, please, and everyone will get his chance. (*This can easily rate as the most embarrassing part of the meeting. Several minutes of complete silence pass while everybody looks around expectantly. There is a feeling of sympathy for the speaker mingled with thoughts of poetic justice. Finally a little man in the rear rises and begins to say something.*) Won't you come down in front so we can hear? (*After another false start the little man is brought up to the microphone, which is adjusted to size with the accompaniment of good-natured jests.*)

LITTLE MAN: I just wanted to thank Dr. Argon for his clear presentation of the subject. I'm sure we'll all profit greatly from his remarks on this important topic.

(*The meeting is hastily adjourned and the crowd disintegrates.*)

FIFTEEN YEARS AGO
(From Our Files of July, 1931)

Proposed legislation initiated by Senator Hiram Bingham (Conn.) arouses chemical industry and undoubtedly strong opposition will develop to bring about its defeat. The proposed bill is designed to regulate interstate commerce in poisonous volatile substances. While methanol is not specifically mentioned, it is thought that the bill is aimed at the regulation and quite probably the elimination of synthetic methanol as an antifreeze.

One of the largest remaining unmined tracts of high-grade phosphate rock in the state of Tennessee is purchased by the Victor Chemical Works, of Chicago, from the Globe Phosphate Co.

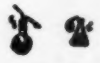
Winners at the Salesmen's golf tournament at Canoe Brook, June 23, include Al. Alvarez, of Grasselli; C. S. Benjamin, of General Chemical; Stanley M. Weil, Natural Products Refining; and Richard Noonan, Drug Products.

THIRTY YEARS AGO
(From Our Files of July, 1916)

The German submarine Deutschland arrives with a cargo of aniline dyes estimated at from 500 to 700 tons. It seems that Germany's object in sending dyes must be regarded as a sort of warning to American manufacturers. If she can postpone, even for a few months, the investment of further capital in the American dyestuff industry, it will facilitate greatly her efforts to regain her dye monopoly after the close of the war.

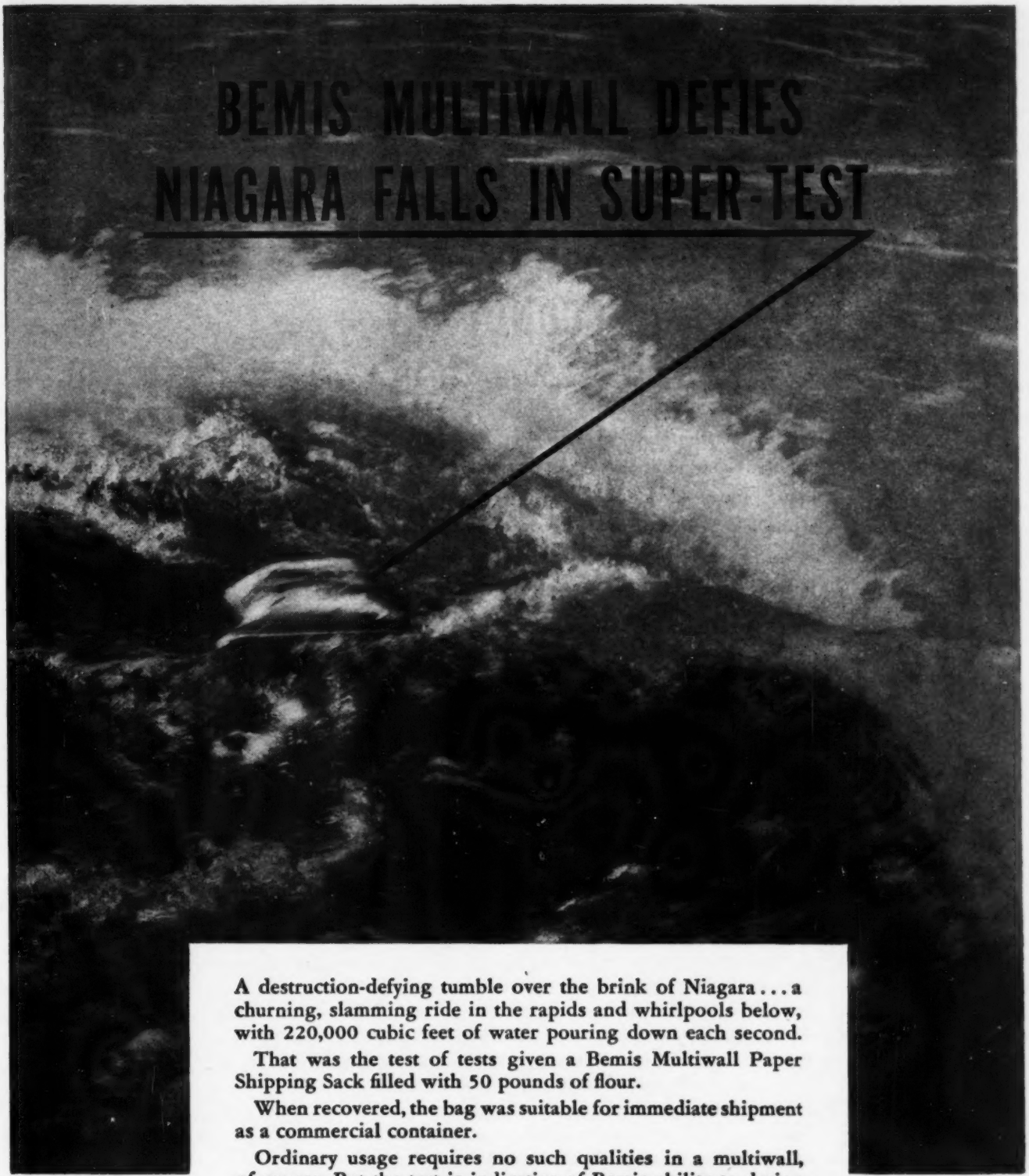
A bill is introduced into Congress by Senator Shafroth to adopt the weights and measures of the metric system as the standard of weights and measures in the United States.

Recent examinations by the chemists engaged in the enforcement of the Food and Drugs Act of shipments of benzoic acid offered for entry into the United States reveal that much of it is adulterated with boric acid. This is probably due to the high price which benzoic acid now commands owing to its scarcity. It is quoted at about eleven dollars per pound.



IF YOU ARE a DDT manufacturer, you had better watch out for Egyptians. We just read in the newspaper that the Egyptian Health Minister has recommended DDT as a disinfectant (sic) in the fight against relapsing fever, but many peasants have refused to use it. "They say the mixture is 'profane' and the product of Satan himself," says the item.

The health ministry urged preachers to extol DDT's "non-Satanic" virtues.



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From Official Gazette—Vol. 584, Nos. 3, 4—Vol. 585, Nos. 1, 2 (March 19-April 9)—p. 683

* *Metallurgy, Ores*

Froth flotation process for beneficiation of metallic sulfide ores, steps of forming pulp of ore, and agitating and aerating pulp in presence of collector comprising mixture of a blown fatty oil and a petroleum body. No. 2,395,639. Louis Monson and Orson Shepard to Petroite Corp. Ltd.

Low alloy high tensile steel having deep drawing properties, high fatigue resistance and freedom from strain and quench aging, consisting of carbon, manganese, silicon, chromium, vanadium, molybdenum, iron, and incidental impurities. No. 2,395,686. Luciano Selmi and Clarence Altenburger to National Steel Corp.

Low alloy steel having inherently fine grain with hardenability variable through wide ranges, consisting of carbon, manganese, silicon, chromium, molybdenum, vanadium, iron, and incidental impurities. No. 2,395,687. Luciano Selmi and Clarence Altenburger to National Steel Corp.

Low alloy steel for use as high tensile steel and case carburizing purposes in low carbon ranges and having improved heat treating properties in higher carbon ranges, consisting of carbon, manganese, silicon, chromium, vanadium, iron, and incidental impurities. No. 2,395,688. Luciano Selmi and Clarence Altenburger to National Steel Corp.

Removing from surface of metals resistant to fused caustic alkalies dense firmly adherent oxide which comprises subjecting oxide to fused anhydrous bath comprising caustic alkali containing oxidizing agent, and then subjecting oxide to action of weak inorganic acid. No. 2,395,694. Harry Spence and Horace Hooker to Hooker Electrochemical Co.

Concentration by froth flotation of oxides of heavy metals containing iron oxide and siliceous gangue, using as collector an aliphatic compound selected from fatty acids, fatty alcohols, sulfated fatty acids, and sulfated alcohols, step of adding first to pulp a non-collecting organic compound having one of schematic formulas shown in patent. No. 2,395,866. Gregoire Gutzeit.

Silver solder composed of 25 to 60% silver, 10 to 35% copper and 20 to 50% antimony. No. 2,396,009. Franz Hensel to P. R. Mallory & Co. Inc.

Electric contact formed of gold base alloy containing metal selected from lead and thallium. No. 2,396,100. Franz Hensel to P. R. Mallory & Co. Inc.

Deep-drawing formable magnesium-base alloys wherein sheet of metal is forced through a die, improvement which comprises cooling each portion of sheet immediately after its passage through die to below 200° F. No. 2,396,218. Donald Watters to The Dow Chemical Co.

Preparing low carbon iron, cobalt, aluminum alloy which comprises melting iron and cobalt, oxidizing melt to remove carbon, casting alloy, remelting, and adding aluminum to melt. No. 2,396,375. David Howerton to Western Electric Co. Inc.

Structural element, part of which subjected to abrasion and wear at elevated temperatures, and which is capable of resisting corrosive action of lead oxide, said part comprising alloy containing nickel, chromium, tungsten, cobalt, carbon, and iron. No. 2,396,552. Arthur Cape to Coast Metals, Inc.

Purification of zinc electrolytes by metallic precipitants: step of contacting electrolyte with zinc dust coated with copper and tin as precipitant. No. 2,396,569. Dinsmore Griffith and Luther Hendrickson to Hudson Bay Mining & Smelting Co. Ltd.

Separating manganese from its ores having impurities including iron. No. 2,396,570. Pietro Guareschi.

Flux for welding magnesium-base alloys which consists of: (a) mixture of calcium chloride, potassium chloride, and sodium chloride, and (b) fluoride of metal from sodium, potassium, magnesium, calcium, barium, aluminum, beryllium. No. 2,396,604. Hans Reimers to The Dow Chemical Co.

* *Organic*

Preparing cracked phenols. No. 2,394,978. Richard Brandon to Standard Oil Development Co.

Metallizable stilbene triazole azo compounds. No. 2,394,998. Ernst Keller to J. R. Geigy A. G.

Dehydration of acetic acid and other lower fatty acids. No. 2,395,010. Donald Othmer.

Producing beta-diketones, which comprises reacting ester of a beta-diketonic carboxylic acid with aliphatic carboxylic acid. No. 2,395,012. William Reeder and George Lescisin to Carbide & Carbon Chemicals Corp.

Production of diolefin of four to five carbon atoms per molecule from corresponding normal paraffin. No. 2,395,016. Walter Schulze and John Hillyer to Phillips Petroleum Co.

Reacting sulphur dioxide with conjugated diolefin to produce crystalline sulphone of latter. No. 2,395,050. George Hooker, Lewis Drake, and Stephen Stowe to The Dow Chemical Co.

Refining sulphate turpentine containing malodorous compounds which comprises treating turpentine with silver peroxide. No. 2,395,055. Eugene Lorand to Hercules Powder Co.

Recovery method in process for making butadiene. No. 2,395,057. Jay Marsh and Melville Hitchcock to Carbide & Carbon Chemicals Corp.

Treatment of abietoyl compounds having same unsaturation in molecule. No. 2,395,278. Nicholas Kalman to Ridbo Laboratories, Inc.

* *Continued from Vol. 583, Nos. 3, 4, Vol. 584, Nos. 1, 2.*
(Continued on following page)

Patents Available for License or Sale

The Patent Office is regularly publishing a Register of Patents Available for Licensing or Sale. Patents concerning chemical, products and processes appear below.

May 21, 1946

Pat. 2,365,173. **Starch Esterification.** Patented Dec. 19, 1944. The use of phosphoric acid as a dispersing and dehydrating agent in place of sulphuric acid provides a rapid method of producing acetylation of starch to obtain a product (such as starch acetate) of better chemical purity and stability. Concentration of the acid depends on the type of starch used. Method recited in patent. (Owner) Stein, Hall & Company, Inc., 285 Madison Avenue, New York, N. Y. Groups 20—94; 28—89. Reg. No. 2,777.

May 28, 1946

Pat. 2,167,591. **Pump Rod Guide and Check.** Patented July 25, 1939. Device is adapted for insertion into an oil well casing and constructed to slidably receive a pump rod. Consists of an elongated tubular body with a head at one end and a stop at the other, between which is mounted a slidable carrier. Head has inclined sides. Pivoted slips and the carrier held by coil springs bear against the head to permit the rod to be lowered to any desired point, or in the event of breakage of the rod, to prevent its falling. (Owner) Myrtle M. Slaugenhop, Everglades, Fla. Group 35—32. Reg. No. 2,812.

Pat. 2,001,270. **Combined Rod Guide, Rod Check, and Paraffin Swab.** Patented May 14, 1935. Accessory is mounted on the pump rod of an oil well to minimize friction between rod and casing. Consists of a shank having upper and lower valve stops with a loosely mounted guide between. The guide has a hollow tapering sheet metal swab which removes sludge and paraffin as rod is withdrawn. The accessory also serves to prevent injury should rod be accidentally dropped. (Owner) Myrtle M. Slaugenhop, Everglades, Fla. Group 35—32. Reg. No. 2,813.

June 4, 1946

Pat. 2,126,671. **Rod Cleaner.** Patented Aug. 9, 1938. Device is adapted to remove sludge and other foreign matter from a sucker rod as it is withdrawn from a well and is practically universal in adapting itself to various sizes of rods and types of couplings. Embracing the rod and functioning as wipers are a pair of flexible metal fabric loops which are placed within a pair of overlapping U-shaped frames centered on aligned bars. The bars are pivoted at one end and provided with handle grips at the other. (Owner) Myrtle M. Slaugenhop, Everglades, Fla. Group 35—32. Reg. No. 2,814.

Pat. 2,195,344. **Tank Cleaner.** Patented Mar. 26, 1940. By manipulation of a crank, scrapers are moved along a screw positioned across the bottom of a cylindrical storage tank to effect drainage of sludge with one stroke without intermixing the sediment with the contents of the tank. Applicable to oil storage tanks. (Owner) Myrtle M. Slaugenhop, Everglades, Fla. Groups 34—95; 35—32. Reg. No. 2,815.

The following patents owned by Walter Kidde & Company, Inc., 675 Main St., Belleville, N. J., have been dedicated to the public of the United States by instrument filed in the United States Patent Office which reads as follows:

* * * does hereby assign, transfer, and dedicate to the people of the United States of America, the entire right, title, and interest in and to said inventions and letters patent for their free use thereof * * *.

Pat. 1,884,458. **Draw-Off Valve.** Patented Oct. 25, 1932. Valve for drawing off poisonous, inflammable or explosive liquids prevents dripping or leakage and contact of the liquid with air by introducing a non-oxidizing gas into valve. A protective zone of such gas surrounds liquid as it flows through valve. When valve is closed gas is admitted to an intermediate chamber and confined under pressure between two poppet valves to maintain them in closed position. When valve is opened supply of gas to the intermediate chamber is cut off, the confined gas released and fluid admitted to valve. During operation gas is automatically turned on and off. Groups 33—66; 35—69.

Pat. 1,952,005. **Control for Producers of Inert Gases.** Patented Mar. 20, 1934. Groups 35—69; 36—19.

Pat. 2,093,379. **Method of Producing Combustion-Inhibiting Gas.** Patented Sept. 14, 1937. Groups 35—69; 36—19.

(Continued on following page)

(Continued from preceding page)

The above two patents relate to an apparatus automatically controlled by a combination of electrical and mechanical devices for the production of inert gases from exhaust gases of an internal combustion engine. The gas is automatically analyzed and diverted either to the atmosphere or to a storage tank depending upon quality of the gases. Initial generation of the gases is controlled by reaction of pressure of the selected stored gases.

Pat. 2,037,158. **Apparatus for Production of Inert CO_2 Containing Gas.** Patented Apr. 14, 1936. Provides an apparatus for the production and storage of inert gas from the exhaust of an oil-burning internal combustion engine carrying a varying load in which the satisfactory gases are automatically diverted when the engine operates near or at full load. Group 35—69.

Pat. 2,042,646. **Method of and Means for Analyzing Gases by Differential Thermal Conductivity Measurements.** Patented June 2, 1936. Determines, by double-sampling thermal conductivity cells, the quality of a particular ingredient contained in changing gas mixtures so that, from such determination, the proportion of other ingredients in the mixture may be deduced. For example, a continuous sample of gas containing gasoline is drawn from a supply and diverted into two conduits, the CO_2 in one sample being chemically removed in one conduit, the other sample being unchanged, both samples being delivered to the cells simultaneously where the difference between conductivity is registered or percentage of CO_2 indicated by an instrument. Group 35—69.

Pat. 2,049,987. **Method of and Means for Protecting Combustibles.** Patented Aug. 4, 1936. Provides and maintains a safe zone above combustibles stored in tankers or the like so that the atmosphere in such zone is non-inflammable and at substantially atmospheric pressure. Samples of gas above the liquid are automatically and continuously withdrawn and analyzed for inflammability, such analysis being registered and inert gas injected into the tanks to preserve an average inertness, the injection depending upon the analysis. Group 35—69.

Pat. 2,080,102. **Means for Collecting Exhaust Gases.** Patented May 11, 1937. Produces inert gases for the purpose of fire protection from the exhaust gases of an internal combustion engine carrying a varying load which is primarily used as a prime mover supplying power for other purposes without disturbing the performance of such engine. Group 35—69.

Pat. 2,142,545. **Pressure Actuated Control Means in Systems for Generation of Inert Gases.** Patented Jan. 3, 1939. Automatically actuated valves regulate the pressure and control the passage of the inert gases therethrough. Compressor, operatively connected to the internal combustion engine supplying the exhaust gas, has its inlet and outlet pressures so regulated that the compressor places a uniform load on the engine permitting adjustment for uniform carburetion under substantially fixed load conditions. Constant pressure is maintained at the inlet of the compressor by automatically reintroducing gas from the outlet when pressure at the intake drops below a predetermined point. Group 35—69.

Pat. 2,247,625. **Production of Inert Gas.** Patented July 1, 1941. A process for producing inert gases practically free of nitrogen peroxide so that tanks or pipe in which the gas is stored for fire protection purposes etc., will not be corroded. The gas is first subjected to compression of not less than 180 lbs., per square inch to effect quick oxidation of the water insoluble nitric oxide in the gas to form water soluble nitrogen peroxide which is readily removed by the scrubbing and filtering operation prior to entry into the storage tanks. Groups 23—X4; 35—69.

The following applications owned by Walter Kidde & Company, Inc., 675 Main St., Belleville, N. J., have been abandoned and dedicated to the public of the United States by instruments recorded in the United States Patent Office which reads in part as follows:

* * * does hereby assign, transfer and dedicate to the people of the United States of America, the entire right, title, and interest in and to said inventions for their free use thereof; and the Commissioner of Patents is hereby authorized to make such publication of this abandonment, assignment and dedication as may be deemed desirable. * * *

Ser. No. 399,858. **Method of Safely Rendering an Atmosphere Incapable of Supporting Combustion.** Filed June 26, 1941. Groups 28—86; 35—69.

Ser. No. 490,749. **Regulating Means.** Filed June 14, 1943. Groups 28—86; 35—69.

Ser. No. 509,176. **Means for Safely Rendering an Atmosphere Incapable of Supporting Combustion.** Filed Nov. 6, 1943. Groups 28—86; 35—69.

Ser. No. 509,177. **Inertness Control System.** Filed No. 6, 1943. Groups 28—86; 35—69.

The four inventions listed above relate to the prevention of combustion during the manufacture and storage of such materials as paint, varnish, film, rayon, rubber, liquids, or the like by rendering the atmosphere of an enclosure in which the articles are made or stored incapable of supporting combustion by the provision of an inert gas substantially a mixture of nitrogen and carbon dioxide, the density of which is equal to air and permits workmen to enter the enclosure without ill effects. The system is controlled by a galvanometer responsive to the flow of current in a gas analyzing unit which acts to effect energization and de-energization of an electromagnetic valve in the supply duct connecting the enclosure with the source of inert gas. A reversible electromagnetic motor regulates the quality of the combustion gas produced in the carburetor used in the manufacture of the inert gas.

June 11, 1946

A booklet giving the patent numbers and titles of 434 patents dedicated to the public has been compiled by the Patent Office. Copies may be obtained without cost by writing the Commissioner of Patents and asking for the publication entitled "Dedicated Patents."

(Continued from preceding page)

Catalytic conversion of hydrocarbon by contact with volatile metal halide conversion catalyst deposited on porous granular supporting material. No. 2,395,263. Arch Foster to Phillips Petroleum Co.

Catalytically dehydrogenating hydrocarbons which comprises subjecting hydrocarbon to action of composite consisting of alumina and other metal oxide having dehydrogenating properties. No. 2,395,058. William Mattox to Universal Oil Products Co.

Cevitamic acid compound of member of arsenic and antimony. No. 2,395,069. Simon Ruskin.

Compound of phthalocyanine series characterized by presence of thiocyano group (SCN) as substituent for hydrogen in its arylene nuclei. No. 2,395,117. Norman Haddock to Imperial Chemical Industries Ltd.

Demethylating methylated benzene hydrocarbon charging stocks containing nine and ten carbon atoms and simultaneously producing gas of enhanced calorific value. No. 2,395,161. Stanley Ashmore and Ernest Penny.

Refining crude oleoresin containing iron and other acid soluble contaminating materials, comprising mixing and washing oleoresin with aqueous solution of oxalic acid containing inorganic acid, etc. No. 2,395,190. Ray Lawrence to the Secretary of Agriculture of the United States of America.

Recovery of olefins partially in form of mono-alkyl benzene and partially in form of olefin concentrate from hydrocarbon mixture of low-boiling olefin and a paraffin. No. 2,395,198. Walter Schulze to Phillips Petroleum Co.

Converting poly-alkyl benzene to mono-alkyl benzene in which alkyl group is same as in poly-alkyl benzene which comprises contacting poly-alkyl benzene in absence of benzene with solid contact catalyst consisting of silica gel activated with alumina. No. 2,395,199. Walter Schulze and Joseph Lyon, Jr. to Phillips Petroleum Co.

Dehydrating 7-hydroxy-cholesterols which comprises heating 3-monoester of 7-hydroxy-cholesterol in presence of solid dehydrating agent selected from anhydrous copper sulfate, fused potassium hydrogen sulfate, aluminum oxide, and calcium carbide. No. 2,395,232. Walter Meuly, Hans Rosenberg and Daniel Terry to E. I. du Pont de Nemours & Co.

Preparing alkyl mercaptans wherein an alkyl halide of 8 to 18 carbons is reacted with alkali metal hydrosulfide, which comprises carrying out reaction in presence of hydrogen sulfide and finely divided metal above hydrogen in electromotive series. No. 2,395,240. Walter Wirth to E. I. du Pont de Nemours & Co.

Ethanolamine. No. 2,395,281. Donald Loder to E. I. du Pont de Nemours & Co.

Separating constituents of kraft pulp mill soap which comprises extracting same with mixture of aliphatic ketone and water whereby sodium salts of fatty acids and oxidized rosin acids are separated out as insoluble precipitate. No. 2,395,282. Joseph Lovas and Paul Bruins.

Treating crude kraft soap. No. 2,395,283. Joseph Lovas and Paul Bruins.

Separating and recovering constituents of tall oil and other mixtures containing water-insoluble fatty acids, rosin acids, sterols and pitch. No. 2,395,284. Joseph Lovas and Paul Bruins.

Preparation of reaction product of ethylene and acetal which comprises reaction being induced by a peroxygen-type catalyst, etc. No. 2,395,292. Merlin Peterson and Arthur Weber to E. I. du Pont de Nemours & Co.

Preparation of heavy metal soaps of fatty acids, which comprises passing fatty acid and air into reaction zone charged with heavy metal selected from lead, copper, cadmium, zinc, iron, nickel, silver, and tin. No. 2,395,307. Arthur Weber and Clement Hamblet to E. I. du Pont de Nemours & Co.

N-normalbutyl-pyrrolidine salt of 2,4-dinitro-6-cyclohexyl-phenol. No. 2,395,315. Edgar Britton and John Hansen to The Dow Chemical Co.

Making permanently transparent tablets of camphor which comprises placing charge of opaque camphor in die, etc. No. 2,395,321. Gastao Etzel and Thomas Dillon to E. I du Pont de Nemours & Co.

Amino ethers. No. 2,395,336. Clinton MacMullen and Herman Bruson to Rohm & Haas Co.

Sapogenin derivatives and preparation of same. No. 2,395,337. Russell Marker, Harry Crooks, Jr. and Eugene Wittle to Parke, Davis & Co.

Preparation of a glycosidic derivative of exodihydro-pseudo-sapogenin acylated at exo-hydroxyl group and in sugar residues. No. 2,395,338. Russell Marker, Harry Crooks, Jr. and Eugene Wittle to Parke, Davis & Co.

Hydrolyzing an acylated glycosidic derivative of a steroid. No. 2,395,339. Russell Marker, Harry Crooks, Jr. and Eugene Wittle to Parke, Davis & Co.

Isomerizing and acylating side chain attached to ring D of glycosidic derivative of steroidal sapongenin. No. 2,395,340. Russell Marker, Harry Crooks, Jr. and Eugene Wittle to Parke, Davis & Co.

Separately recovering fractions rich in ethane, ethylene and acetylene from gaseous mixture containing same. No. 2,395,362. Charles Welling to Phillips Petroleum Co.

Phenyl sulphonyl esters of nitro alcohols. No. 2,395,386. Philip Baker, Jr. to Commercial Solvents Corp.

Production of ketomono-alcohols, which comprises maintaining mixture of formaldehyde and ketone of formula $CH_3—CO—CH_2R$, where R is from hydrogen and methyl, under mildly alkaline conditions. No. 2,395,414. James Lincoln and James Drewitt to British Celanese Ltd.

Preparing carboxylic esters of hydroxydihydronorpolycyclopentadiene having acyl group attached through oxygen to one terminal cycle and having double bond in opposite terminal cycle. No. 2,395,452. Herman Bruson to The Resinous Products & Chemical Co.

Addition product of thiocyanic acid and aliphatic ketone having double bond between carbon atoms in alpha-beta-position, product being a beta-thiocyano ketone. No. 2,395,453. Herman Bruson to Rohm & Haas Co.

Thiocyano aliphatic ethers of hydroxydihydronordicyclopentadiene. No. 2,395,454. Herman Bruson to The Resinous Products & Chemical Co.

Dihydronorpolycyclopentadienyl isothiocyanate addition-rearrangement product of nascent thiocyanic acid and a crystalline polycyclopentadiene. No. 2,395,455. Herman Bruson to The Resinuous Products & Chemical Co.

Diamidines. No. 2,395,471. Arthur Ewins to May & Baker Ltd.

Bis sulphonamides of naphthol sulphonyl chlorides with aromatic diamines. No. 2,395,484. Andrew Jennings to E. I. du Pont de Nemours & Co.

Separating mononuclear from polynuclear aromatic compounds which comprises contacting mixture of aromatic compounds in liquid phase with solid absorbent to selectivity absorb polynuclear aromatic compounds on solid adsorbent. No. 2,395,491. Julian Mavity to Universal Oil Products Co.

Cyclic process for removing organic sulphur from gas, comprising: scrubbing gas with scrubbing medium containing morpholine to dissolve organic sulphur and form morpholine sulphur complex, etc. No. 2,395,509. Joseph Shaw to Koppers Co. Inc.

Production of di (tertiary butyl) peroxide and of tertiary butyl alcohol which comprises reacting isobutane and oxygen in presence of hydrogen bromide, etc. No. 2,395,523. William Vaughan and Frederick Rust to Shell Development Co.

Hydrogenating 7-hydroxy-8-methylisoquinoline in presence of platinum to convert said compound to 1,2,3,4-tetrahydro-7-hydroxy-8-methylisoquinoline, etc., end product being N-acetyl-7-oximinodihydrohomomeroquinene ethyl ester. No. 2,395,526. Robert Woodward and William Doering to Polaroid Corp.

Purifying copper-ammonium solution used for absorption of unsaturated hydrocarbon from hydrocarbon mixture, to prevent foaming and emulsification during reuse of solution, which includes treating solution with liquid amine from primary and secondary amines insoluble in said solution. No. 2,395,529. Melvin Arnold to The Girdler Corp.

Salt of an alkyl ester of p-amino benoic acid in which alkyl radicle is member of ethyl, propyl and butyl radicles, and b-penyl propionic acid. No. 2,395,538. David Curtis.

Recovering carbon dioxide from gases. No. 2,395,564. Frank May to American Potash & Chemical Corp.

Cyclic process for extracting carbon dioxide from gases, which comprises taking sludge from previous operation of cycle containing solid potassium pentaborate octohydrate and solution of potassium chloride, sodium bicarbonate, potassium pentaborate octohydrate, potassium tetraborate tetrahydrate, and sodium tetraborate decahydrate heating sludge to dissolve potassium pentaborate and to react same with sodium bicarbonate to evolve carbon dioxide gas. No. 2,395,565. Frank May to American Potash & Chemical Corp.

Producing hydroxy derivatives of aromatic hydrocarbons which comprises treating aromatic hydrocarbons with hydrogen peroxide in initially anhydrous environment, in presence of oxide of metal which forms unstable peracids. No. 2,395,638. Nicholas Milas to Research Corp.

Isomerization of light naphtha. No. 2,395,680. Cecil Nysewander and Nathan Fragen to Standard Oil Co.

Unsaturated derivatives of carbamic acid. No. 2,395,750. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Making a beta-diketone from enol-ester isomeric therewith which comprises heating acyl ester of enolic form of a ketone to 300° to 700° to cause acyl group of acyl ester to migrate to form a diketone. No. 2,395,800. Albert Boese, Jr. and Frank Young, Jr. to Carbide & Carbon Chemicals Corp.

Obtaining dichlorodifluorosilane, which comprises heating mixture of silicon tetrachloride and silicon tetrafluoride. No. 2,395,826. Julian Hill, Richard Lindsey, Jr. and Richard Wiley to E. I. du Pont de Nemours & Co.

Preparing finely divided nitroguanidine which comprises forming aqueous solution of nitroguanidine at above 95° C., adding ethylene diamine and cooling. No. 2,395,856. George Foster and Emil Williams to American Cyanamid Co.

Preparing finely divided nitroguanidine which comprises forming aqueous solution of nitroguanidine at above 95° C., adding ethylol dodecyl biguanide acetate. No. 2,395,857. George Foster and Emil Williams to American Cyanamid Co.

Preparing finely divided nitroguanidine which comprises forming aqueous solution of nitroguanidine, adding diethylene triamine and cooling. No. 2,395,858. George Foster and Emil Williams to American Cyanamid Co.

Preparing finely divided nitroguanidine which comprises forming aqueous solution of nitroguanidine at above 95° C., adding triethylene tetramine. No. 2,395,859. George Foster and Emil Williams to American Cyanamid Co.

Preparing finely divided nitroguanidine which comprises forming aqueous solution of nitroguanidine at above 95° C., adding tetraethylene pentamine. No. 2,395,860. George Foster and Emil Williams to American Cyanamid Co.

Dehydrogenating hydrocarbons of class of monoolefins and alkylated aromatics which comprise exposing hydrocarbons under dehydrogenating conditions to influence of catalyst comprising magnesia, iron oxide and potassium oxide. No. 2,395,875. Kenneth Kearby to Jasco, Inc.

Dehydrogenating olefins to diolefins comprising passing mixture of olefin and steam over dehydrogenation catalyst which comprises magnesium oxide, active dehydrogenating metal oxide and potassium oxide as promoter. No. 2,395,876. Kenneth Kearby to Standard Oil Development Co.

Introducing portions of ketene into liquid body maintained at − 50° C. and + 30° C., and containing dry hydrocyanic acid and basic condensation catalyst and recovering member of group of 1-cyanovinyl acetate and dimolecular acetyl cyanide. No. 2,395,930. Franklin Johnston and Lawrence Newton to Carbine & Carbon Chemicals Corp.

The phosphoric acid di-esters of alpha: alpha'-di-ethyl-4': 4''-dihydroxy-diphenylethane. No. 2,395,934. Karl Miescher and Jules Heer to Ciba Pharmaceutical Products Inc.

Recovery of olefins and/or diolefins from hydrocarbon mixtures containing same. No. 2,395,954. Newcomb Chaney to The United Gas Improvement Co.

Cyclic process for separating unsaturated hydrocarbon selected from olefins and diolefins from hydrocarbon mixture containing unsaturated hydrocarbon to be separated and hydrocarbon material of lesser unsaturation than unsaturated hydrocarbon to be separated. No. 2,395,955. Frank Soday to The United Gas Improvement Co.

Recovering unsaturated hydrocarbon material from olefines and diolefines from mixture which comprises contacting mixture in presence of polymerization inhibitor and solid monovalent salt of metal selected from silver, copper, and mercury to form complex between compound and salt. No. 2,395,956. Frank Soday to The United Gas Improvement Co.

Concentrating light oil diolefine fraction containing olefine material comprising contacting same with powdered cuprous chloride containing organic amine. No. 2,395,957. Frederick Breuer to The United Gas Improvement Co.

Cyclic process for separating aliphatic conjugated pentadiene material in more concentrated form from mixture in which cycle mixture is contacted in liquid phase with finely divided solid dry monovalent salt of metal from copper, mercury and silver, etc. No. 2,395,958. Frank Soday to The United Gas Improvement Co.

Concentrating butadiene-containing mixture with respect to butadiene comprising contacting mixture with non-aqueous reagent containing solid monovalent salt of copper to form butadiene-reagent salt complex, etc. No. 2,395,959. Frank Soday to The United Gas Improvement Co.

Quaternary ammonium nitrophenates. No. 2,395,989. Louis Bock and Alvan Houk to Rohm & Haas Co.

Continuous method of making ferro-pentacarbonyl, which comprises continuously directing two high velocity jets of carbon monoxide gas into reaction chamber, introducing powdered metal into at least one of jets and impinging two jets directly upon each other to break up powdered metal, etc. No. 2,395,999. John Fill to Maguire Industries, Inc.

Preparation of 2-chloropyrazine. No. 2,396,066. Philip Winnek to American Cyanamid Co.

Producing 2-aminopyrazine which comprises reacting anhydrous ammonia with 2-halogenated pyrazine selected from 2-chloropyrazine and 2-bromopyrazine. No. 2,396,067. Philip Winnek and Quintin Cole to American Cyanamid Co.

Preparation of trifluoro acetic acid which comprises adding oleum to CF_3CCl_3, when reaction is complete decomposing reaction mixture with water. No. 2,396,076. Anthony Benning and Joseph Park to E. I. du Pont de Nemours & Co.

Salicylal glucamine. No. 2,396,097. Ivan Gubelmann to E. I. du Pont de Nemours & Co.

Producing cumene. No. 2,396,144. John Anderson, Edwin Bullard and Sumner McAllister to Shell Development Co.

Organic substance, normally subject to deterioration caused by molecular oxygen, containing catalyst of group of vanadium, chromium, manganese, iron, cobalt, copper and their compounds, and p-benzylaminophenol to retard such deterioration, and having incorporated metal deactivator to deactivate catalyst. No. 2,396,156. Richard Clarkson to E. I. du Pont de Nemours & Co.

Preparing melamine which comprises heating cyanourea under pressure at 200° C. No. 2,396,193. Joseph Paden and Johnstone Mackay to American Cyanamid Co.

Production of acetyl cyanide which comprises contacting ketene and hydrogen cyanide in vapor phase within 200° to 400° C. with surface-active material. No. 2,396,201. Gardner Ray to Phillips Petroleum Co.

Effecting methylation of unsaturated organic compounds, step of heating vaporous mixture comprising organic compound containing terminal olefinic linkage and di (tertiary alkyl) peroxide. No. 2,396,206. Frederick Rust and William Vaughan to Shell Development Co.

Incorporating alkyl radicals, step of subjecting vaporous mixture comprising organic compound and a di (tertiary alkyl) peroxide to between 150° C. and 275° C. to effect decomposition of peroxide and incorporation of alkyl radicals formed into organic compound. No. 2,396,217. William Vaughan and Frederick Rust to Shell Development Co.

Long chain paraffinic hydrocarbon compound of arsenic, said compound being solid paraffin containing arsenic radical linked directly to a carbon atom of chain, arsenic radical corresponding to formula $—(AsO_2M_2)$ wherein M represents positive salt-forming radical of a water-soluble salt of arsenious acid. No. 2,396,258. Ernst Friedheim.

Aliphatic dinitro-olefin characterized by attachment of nitro group to each carbon atom of aliphatic olefin group. No. 2,396,282. Edwin Nygaard and Thomas Noland to Socony-Vacuum Oil Co. Inc.

Producing esters of alpha-hydroxy alkyl cyanides. No. 2,396,292. Ober Slotterbeck to Standard Oil Development Co.

Segregation of a diolefin from mixture of diolefin and more saturated hydrocarbons of similar boiling points which comprises extracting feed mixture with solvent consisting of liquid ammonia and modifying solvent which reduces dissolving capacity of ammonia. No. 2,396,300. George Cummings, William Sweeney and Merrell Fenske, one-half to Standard Oil Development Co., and one-half to Rohm & Haas Co.

Segregation of a mono-olefin from mixture of saturated and unsaturated hydrocarbons and a mono-olefin containing constituents of similar boiling points. No. 2,396,301. George Cummings, William Sweeney and Merrell Fenske, one-half to Standard Oil Development Co., and one-half to Rohm & Haas Co.

Segregation of naphthenes with average molecular weight less than 250 from feed mixture consisting of naphthenes and paraffins, constituents of which boil over narrow boiling range. No. 2,396,302. George Cummings, William Sweeney and Merrell Fenske, one-half to Standard Oil Development Co., and one-half to Rohm & Haas Co.

Segregation of aromatic hydrocarbon compound from hydrocarbon mixture containing constituents with molecular weights less than 300. No. 2,396,303. George Cummings, William Sweeney and Merrell Fenske, one-half to Standard Oil Development Co., and one-half to Rohm & Haas Co.

Preparing aliphatic and cycloaliphatic nitrates which comprises reacting compound from secondary and tertiary aliphatic and cycloaliphatic alcohols with nitric acid in presence of acetic anhydride. No. 2,396,330. James Lufkin to E. I. du Pont de Nemours & Co.

Production of butadiene from pentene-2 which comprises subjecting pentene-2 to pyrolysis. No. 2,396,416. Frederick Frey to Phillips Petroleum Co.

Ester selected from beta-phenoxyethyl acrylate and beta-benzyloxyethyl acrylate. No. 2,396,434. Chessie Rehberg and Charles Fisher to the Secretary of Agriculture of the United States of America.

Producing pyridinecarboxylic acid, which comprises oxidizing phosphate of pyridine-ring-containing compound of alkyl pyridines, quinoline, isoquinoline, and alkyl quinolines, with nitric acid. No. 2,396,457. Francis Cislak and William Wheeler to Reilly Tar & Chemical Corp.

Protecting organic material subject to attack by microorganism which comprises treating material with 2,2,3,4,4-pentachloro-3,4-dihydronaphthalenone-1(2). No. 2,396,468. Elbert Ladd to United States Rubber Co.

Separating resin and fatty acid components of tall oil, which includes heating tall oil in presence of catalyst having type formula RSO_3H and $ROSO_3H$, where R is organic radical, etc. No. 2,396,471. Arthur Osterhof to Hercules Powder Co.

Chloraralkyl esters of thio acids. No. 2,396,487. Edward Blake to Monsanto Chemical Co.

N-acyl derivatives of aminobiphenyls. No. 2,396,502. Earl Gluesenkamp to Monsanto Chemical Co.

Preparing hydroxyphenylamino-propane compounds, which comprises treating one of group of compounds consisting of eugenol and chavicol with hydrogen halide, boiling addition product under reflux with amine in aqueous volatile solvent and purifying. No. 2,396,580. Fritz Kulz.

From Official Gazette—Vol. 584, Nos. 3, 4—Vol. 585, Nos. 1, 2 (March 19-April 9)—p. 686

Producing monomeric methacrylic acid chloride which comprises dehydrohalogenating beta-chloro-isobutyric acid chloride, by heating chloride in liquid phase in presence of activated carbon to split off hydrogen chloride. No. 2,396,609. Walter Schmidt.

Pimelic acid derivatives disubstituted in the gamma-position and process of preparing same. No. 2,396,626. Georg Wiest and Heinrich Glaser.

* *Paints, Pigments*

Protecting drying oil composition against development of surface skins during storage in package and improving toughness, durability and body after application as protective film, comprising incorporating into drying oil composition a protective substance prepared by distilling out from petroleum compound portion of lower boiling components, thermally cracking residual higher boiling components, etc. No. 2,396,050. Henry Kellog and Harold Reynolds, Jr. to Standard Oil Development Co.

Flatting agent comprising partially dried and unshrunk organogel containing inorganic oxide and having organic solvent as major portion of its liquid phase, said flatting agent exerting pigmenting action. No. 2,396,051. Andre Laus to Monsanto Chemical Co.

Metallized azo pigments. No. 2,396,327. Donovan Kvalnes and Harold Woodward to E. I. du Pont de Nemours & Co.

Monazo pigments. No. 2,396,328. Donovan Kvalnes and Harold Woodward to E. I. du Pont de Nemours & Co.

Diazoamino compounds and printing pastes. No. 2,396,357. Emil Wiest to E. I. du Pont de Nemours & Co.

Liquid pigmented composition comprising liquid organic film forming vehicle containing film forming ingredients of oils and resins, a pigment and saponin, composition characterized by lower degree of flocculation than without saponin. No. 2,396,415. Earl Fischer to Interchemical Corp.

Storage-stable pigmented composition consisting of non-volatile ingredients and dispersible in dilute aqueous alkali to yield pigmented film-forming liquid comprising non-aqueous dispersion of pigment in prolamine of zein group and detergent-soap-forming acid. No. 2,396,430. James Massarene to Interchemical Corp.

* *Paper, Pulp*

Producing mineral-coated printing paper of high gloss and brightness and having excellent ink-deceptivity, which comprises coating web of paper body stock with aqueous slurry of mineral-coating composition consisting of water-dispersible adhesive and causticized calcium carbonate pigment. No. 2,395,992. John Clark to S. D. Warren Co.

* *Petroleum*

Electrical solvent-refining process for refining of petroleum oils to remove undesirable organic constituents therefrom which are soluble in selective solvent partially miscible with oil and which tends to form mixture of conjugate liquid phases which gravitationally separates slowly and difficultly. No. 2,395,011. Roderick Perkins, Jr. to Petrolite Corp. Ltd.

Method of geochemical prospecting wherein soil gases are analyzed containing unstable impurities which normally decreasingly exaggerate results of subsequent analysis for significant hydrocarbon content. No. 2,395,014. Edwin Roper to Stanolind Oil & Gas Co.

Aluminum halide hydrocarbon conversion system wherein liquid product effluent stream from conversion zone contains hydrogen halide and uncombined aluminum halide. No. 2,395,022. Mack Sutton and Cecil Nysewander to Standard Oil Co.

Cracking and coking hydrocarbon oils. No. 2,395,081. Tom Williamson and Ned Scardino to The Texas Co.

Regenerating solid particles contaminated with carbonaceous material. No. 2,395,106. Roland Day and Elmer Kanhofer to Universal Oil Products Co.

Conversion of hydrocarbon oil heavier than gasoline which comprises contacting oil under cracking conditions with catalyst produced by acidifying alkali metal silicate solution to form silica gel, etc. No. 2,395,153. Charles Thomas and Jacob Ahlberg to Universal Oil Products Co.

Selective catalytic conversion of aliphatic olefins of 4 to 8 carbon atoms to isomers of more highly branched chain structure while excluding destructive reactions of cracking, dehydrogenation and polymerization. No. 2,395,274. John Hillyer and Harry Drennan to Phillips Petroleum Co.

Determining oil content of oil-bearing formation traversed by bore hole, comprising taking core of formation, determining lithological character of core and salinity of formation water, preparing samples of material having same lithological character and containing predetermined proportions of oil and water to afford knowledge of relation between resistivity and oil-content, water-content ratio. No. 2,395,617. Henri-Georges Doll to Schlumberger Well Surveying Corp.

Producing isoparaffins and alkylated aromatic hydrocarbons. No. 2,395,775. John Anderson and Robert Castner to Shell Development Co.

Treating gasoline stocks for removal of sulfur and improvement in characteristics as motor fuel. No. 2,395,806. du Bois Eastman to The Texas Co.

Decolorizing hydrocarbon oil, which comprises contacting oil with water-insoluble metal aluminate formed by reaction of alkali metal aluminate and water-soluble salt of metal capable of forming water-insoluble metal aluminate, in presence of compound yielding NH_4+ ions. No. 2,395,931. William La Lande, Jr. to Porocel Corp.

Light tractor fuel having knock rating in range of about 47 to 63 which comprises petroleum distillate having boiling range approximately that of heavy naphtha and synthetic hydrocarbon polymer fraction having higher boiling range than naphtha. No. 2,395,976. Rodney Shankland to Standard Oil Co.

Distilling shale to produce valuable hydrocarbon oils. No. 2,396,036. Forrest Blanding to Standard Oil Development Co.

Catalytically converting high boiling hydrocarbons to lower boiling hydrocarbons. No. 2,396,109. Homer Martin to Standard Oil Development Co.

Hydrocarbon conversion process utilizing Friedel-Crafts type metal halide catalyst wherein effluent saturated hydrocarbons contain residual metal halide, method of freeing effluent hydrocarbon from metal halide which comprises contacting hydrocarbons with metal halide-hydrocarbon sludge. No. 2,396,173. Karl Hachmuth to Phillips Petroleum Co.

Alkylation of isoparaffin with olefin in presence of liquid alkylation catalyst of greater density than hydrocarbons undergoing treatment. No. 2,396,198. Ernest Pevere, Louis Clarke and George Hatch to The Texas Co.

Conversion of high boiling hydrocarbons by catalysts which give best yields at temperatures below "dew point" of charge. No. 2,396,285. Albert Peterkin to Houdry Process Corp.

Separating mineral oil with average molecular weight less than 250 into fractions of different chemical and physical properties, which comprises extracting oil with solvent consisting of liquid ammonia together with liquid modifying solvent soluble in ammonia which reduces solvent power of ammonia for oil to form two liquid phases, etc. No. 2,396,299. William Sweeney, Merrell Fenske and George Cummings, one-half to Standard Oil Development Co., and one-half to Rohm & Haas Co.

Conversion of naphthene hydrocarbons. No. 2,396,331. Robert Marschner to Standard Oil Co.

Subjecting a naphtha to action of catalyst consisting of product of reaction of organic reducing agent on CrO_3 in a slurry of aluminum hydroxide. No. 2,395,048. Robert Hibbard to The Standard Oil Co.

Alkylating saturated hydrocarbon having tertiary carbon atom comprising reacting saturated hydrocarbon with halide having halogenated aliphatic carbon atom in presence of acid alkylation catalyst. No. 2,396,486. Seaver Ballard to Shell Development Co.

* *Photographic*

Producing color photographic image in silver halide emulsion which comprises exposing emulsion and developing it with primary aromatic amino developing agent in presence of compound from acylacetamino-1,2,4-triazoles. No. 2,395,776. Abraham Bavley to General Aniline & Film Corp.

Photographic silver halide emulsion spectrally sensitized with cyanine dye, emulsion containing, as supersentizer, heterocyclic nitrogen base selected from 2 (1)-quinolones, benzothiazolones and thiazolinones. No. 2,395,846. Burt Carroll and John Spence to Eastman Kodak Co.

Copy for drop-out high-light half tone process characterized in having its high-light areas only coated with photo-phosphorescent material. No. 2,395,985. Burtt Berry to Burtt Berry and Lyle Youngdahl.

Copy for drop-out high-light half tone process characterized in having its high-light areas covered with fluorescent material. No. 2,395,986. Burtt Berry to Burtt Berry and Lyle Youngdahl.

Photographic composition comprising colloid binding agent containing as color yielding compound a polymeric quaternary ammonium salt containing recurring quaternary nitrogen atoms having attached a salt forming anion and, through an acyclic carbon atom, a dye intermediate nucleus capable of coupling to form azo dye. No. 2,396,275. James Kirby to E. I. du Pont de Nemours & Co.

Production of photographic dyestuff image which comprises developing photographic element containing reducible silver salt image with aromatic primary amino color developing agent in presence of a substituted 2:4-diarylpyrrole. No. 2,396,396. Douglas Stammers to Imperial Chemical Industries Ltd.

* *Polymers*

Polymerizing in aqueous emulsion a mixture of polymerizable materials containing butadiene-1,3 acrylonitrile and acrylic acid having terminal methylene group. No. 2,395,017. Waldo Semon to The B. F. Goodrich Co.

Polymerization reactor comprising reaction vessel, vertical shaft therein, plurality of paddles attached to shaft, means for oscillating shaft and paddles to provide submerged turbulent agitation of liquid. No. 2,395,079. William Sparks and Donald Field to Jasco, Inc.

Preparing finished isobutylene polymer product prepared by polymerization of isobutylene-containing liquid by application of boron trifluoride. No. 2,395,086. Carll Van Gilder and Hector Evans to Jasco, Inc.

Preparation of 1,3-dioxolane polymers which comprises subjecting ethylene oxide to reaction with formadehydé under anhydrous conditions and in presence of acidic catalyst. No. 2,395,265. William Gresham to E. I. du Pont de Nemours & Co.

Polymerizing ethylene in aqueous medium. No. 2,395,327. William Hanford to E. I. du Pont de Nemours & Co.

Preparing Pentolite which has improved flow properties for casting operations. No. 2,395,341. Gordon McCurdy to Hercules Powder Co.

Heat polymerization of vinyl halides. No. 2,395,344. Frank Schoenfeld to The B. F. Goodrich Co.

Sulphur-containing esters of hydrolyzed interpolymers of ethylene with vinyl ester of organic carboxylic acid, said esters consisting of sulphates and sulphonates. No. 2,395,347. William Sharkey to E. I. du Pont de Nemours & Co.

Polyhydroxyalkyl-isoalloxazine dissolved in water, and water-soluble salt selected from alkali metal, alkaline-earth metal and ammonium and substituted ammonium salts of benzoic acid, etc., said salt being present to maintain isoalloxazine in solution. No. 2,395,378. Henry Miller to Eli Lilly & Co.

Preparation of interpolymers of ethlene and vinyl acetate in presence of catalyst selected from oxygen and peroxy compounds. No. 2,395,381. Lombard Squires to E. I. du Pont de Nemours & Co.

Polymerized condensation product, obtained by heat polymerization in presence of alkaline catalyst from hydroxylated polyethylene amine and high molecular weight monocarboxy acid. No. 2,395,400. Melvin De Groote to Petrolite Corp. Ltd.

Liquid polymerizable mixture comprising monovinyl aromatic compound and dehydrated castor oil. No. 2,395,504. Louis Rubens and Raymond Boyer to The Dow Chemical Co.

Composition comprising fatty oil modified alkyd resin and ester of polysilicic acid and lower monohydric saturated aliphatic alcohol. No. 2,395,550. Ralph Iler, George Latham and John Robinson to E. I. du Pont de Nemours & Co.

Composition comprising copolymer of vinyl chloride and neutral ester of saturated alcohol and fumaric acid modified with alkoxyalkyl ester of aliphatic dicarboxylic acid, composition resistant to cracking at temperature of −50° C. No. 2,395,581. Henry Richter to E. I. du Pont de Nemours & Co.

Normally flexible plasticized polyvinyl alcohol composition containing as thermostabilizing agent a substance selected from sulfates of copper and iron. No. 2,395,616. Charles Dangelmajer to Resistoflex Corp.

Preparing a chloroprene-acrylic nitrile interpolymer. No. 2,395,649. Frederick Wagner to E. I. du Pont de Nemours & Co.

Curing and hardening cast ball of hydrophilic phenol-formaldehyde resin which includes enclosing ball in elastic jacket, subjecting it to vacuum

* *Continued from Vol. 583, Nos. 3, 4, Vol. 584, Nos. 1, 2.*

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to remove entrapped gases, subjecting jacketed ball to heat in liquid under pressure, etc. No. 2,395,675. Harold Luth to The Brunswick-Balke-Collender Co.

Condensing together phenol and formaldehyde in presence of alkaline catalyst, etc. No. 2,395,676. Harold Luth and Kenneth Gregory to The Brunswick-Balke-Collender Co.

Improving resistance to depolymerization by heat of polymerized vinyl ether which comprises finely dispersing therein member of alkali metal and alkaline earth metal sulfides and polysulfides. No. 2,395,684. Calvin Schildknecht to General Aniline & Film Corp.

Resin produced by simultaneously reacting aromatic hydrocarbon with aldehyde and compound from polycarboxylic acids and anhydrides of polycarboxylic acids in presence of condensing agent. No. 2,395,739. Arthur Hershberger to The Atlantic Refining Co.

Polymerizing, in aqueous emulsion, an alkyl ester of 1-carboxybutadiene-1,3 in which alkyl group contains 1 to 4 carbon atoms. No. 2,395,812. Herbert Gudgeon and Rowland Hill to Imperial Chemical Industries Ltd.

Subjecting polystyrene resin to a pyrolysis temperature. No. 2,395,829. Wilbert King to Allied Chemical & Dye Corp.

Producing partially esterfied polysilicic acid liquid compositions, having ratio of ester groups to silicon atoms of from 1:20 to 2:1 and having greater stability against gelling than unesterified polysilicic acids from which they are produced. No. 2,395,880. Joseph Kirk to E. I. du Pont de Nemours & Co.

Preparing high molecular weight polymers by polymerizing isoolefin in diluent at below about −40° C. in contact with Friedel-Crafts type catalyst to form slurry of solid polymer particles in cold reaction liquid, etc., improvement which comprises transferring separated polymer particles to flashing zone concurrently with streams of sealing gas to prevent backing up of flashed gases into cold equipment. No. 2,395,901. Eger Murphree and Wendell Waterman and Arthur Green to Jasco, Inc.

Thermosetting composition capable of being compounded and processed like natural rubber compounds comprising plasticized polyvinyl butyral, heat hardening resin capable of reacting with polyvinyl butyral and zinc oxide as accelerator. No. 2,396,098. Joseph Haas to Hodgman Rubber Co.

Acetal of hydrolyzed interpolymer of ethylene with vinyl ester of organic carboxylic acid. No. 2,396,209. William Sharkey to E. I. du Pont de Nemours & Co.

Preparing xanthate of water-insoluble hydrolyzed interpolymer of vinyl ester of organic carboxylic acid with another polymerizable compound containing single ethylenic double bond. No. 2,396,210. William Sharkey to E. I. du Pont de Nemours & Co.

Making polymers which comprises heating reaction mixture comprising bifunctional reactants which comprises monoaminomonohydric alcohol, and dibasic carboxylic acid, and then heating low molecular weight polymer thus obtained until polymer is formed which can be formed into pliable filaments. No. 2,396,248. Robert Christ to E. I. du Pont de Nemours & Co.

Composition comprising copolymer of vinyl aromatic compound from styrene, alpha methyl styrene, para methyl styrene and alpha methyl para methyl styrene and conjugated diolefin, polymerized isoolefin, and wax. No. 2,396,293. Winthrope Smith to Standard Oil Development Co.

Polyvinyl butyral resin containing 8-hydroxy-quinoline as stabilizer. No. 2,396,555. Fred Cox to Wingfoot Corp.

Polyvinyl butyral resin and tartrate of hexamethylene tetramine as stabilizer. No. 2,396,556. Fred Cox to Wingfoot Corp.

Polyvinyl acetal formed from polyvinyl alcohol and aliphatic aldehyde which contains N,N'-dicyclohexyl ethylene diamine as stabilizer. No. 2,396,557. Fred Cox to Wingfoot Corp.

Copolymer of aliphatic conjugated diene hydrocarbon and alpha (omega carboalkoxy alkyl) acrylonitrile. No. 2,396,586. John Long to Wingfoot Corp.

* *Processes and Methods*

Setting hard grains in setting material, comprising, mixing two powders having such small particles that they are able to enter and fill unevennesses of hard grains; embedding hard grains in powder mixture; and casting into powder mixture a metallic material, etc. No. 2,396,015. Ake Liden and Oscar Malmborg to Svenska Diamantbergborrnings Aktiebolaget.

Conveying in conveyor of screw type a solid granular material which is free flowing as prepared at elevated temperature and which tends to form hard glazed layer at lower temperature while in contact with screw and conveyor wall which consists in maintaining material at temperature of preparation while in conveyor. No. 2,396,454. Clarence Bareis to The Pennsylvania Salt Manufacturing Co.

Preservation of labile products, which in desiccated form are hygroscopic, by vacuum desiccation, step of heating desiccated material while under vacuum to temperature higher than that of surrounding atmosphere and transferring it, with exposure to atmosphere, to container while at elevated temperature. No. 2,396,561. Earl Flosdorf to Lyophile-Cryochem Co.

* *Rubber*

Synthetic rubber composition comprising rubbery polymer of butadiene-1,3 hydrocarbon, and incorporated therein, chlorine containing ester of metacarbonic acid with a monohydric alcohol. No. 2,395,070. Donald Sarbach to The B. F. Goodrich Co.

Adhering vulcanizable rubbery copolymer of butadiene-1,3 hydrocarbon and acrylic nitrile to another vulcanizable rubbery material which comprises placing in adhering relation unvulcanized composition, one of which compositions also comprises chlorine containing ester of carbonic acid with a monohydric alcohol, and then vulcanizing assembly. No. 2,395,071. Donald Sarbach to The B. F. Goodrich Co.

Manufacturing gas-expanded cell-tight rubber. No. 2,395,293. Hans Pfleumer to Rubatex Products, Inc.

Vulcanization of rubbery copolymers of butadiene-1,3 hydrocarbons and alpha-methylene nitriles. No. 2,395,474. Benjamin Garvey to The B. F. Goodrich Co.

Vulcanizing plastic polymerized chloroprene in presence of a polyalkylene polyamine in which alkylene groups are composed exclusively of carbon and hydrogen. No. 2,395,493. Henry Miller to The B. F. Goodrich Co.

Vulcanizing rubbery copolymer of butadiene-1,3 hydrocarbon and copolymerizable mono-olefinic compound in presence of aliphatic polyamines. No. 2,395,505. Donald Sarbach to The B. F. Goodrich Co.

Vulcanizing rubbery copolymer of butadiene-1,3 hydrocarbon and unsaturated compound containing single olefinic double bond, which comprises heating copolymer in presence of mixture of litharge and oxide of metal in group II. No. 2,395,506. Doran Sauser to The B. F. Goodrich Co.

Vulcanizing rubbery copolymer of butadiene-1,3 hydrocarbon and copolymerizable mono-olefinic compound in presence of polyalkylene polyamine. No. 2,395,507. Doran Sauser to The B. F. Goodrich Co.

Fuel tank, comprising uncured rubber container having layer of synthetic rubber insoluble in gasoline cemented to inside surface, an outer tank, and backing of unwoven sisal matting between container and outer tank. No. 2,395,556. Karl Kopplin to Burkart Manufacturing Co.

Vulcanization product of mixture comprising elastomer which is copolymer of mono-olefin and conjugated diolefin, carbon black, para-quinone dioxime, red lead, and salicyclic acid. No. 2,395,778. Samuel Breck and Earle Ebers to United States Rubber Co.

Apparatus for producing sponge rubber, a shaping chamber to receive frothed latex and hold it to shape desired for sponge rubber, spaced electrolytic conductors within chamber, etc. No. 2,395,920. Theodore Te Grotenhuis.

Forming fibrous rubber base which consists in reducing rubber bound fabric of tire carcass stock to flocculent state, intergrinding with resultant powder a quantity of pine-tar, etc. No. 2,395,987. Grover Berryman.

Recovering chlorinated rubber from solution which comprises dropping or spraying droplets of solution through layer of steam onto surface of layer of water so hot that it rapidly separates solvent from chlorinated rubber. No. 2,396,600. Henry Pacevitz, by judicial change of name Henry Pace, to Wingfoot Corp.

* *Specialties*

Solid tanning composition comprising acid-soluble sodium aluminum silicate and masking agent selected from organic carboxylic acids. No. 2,395,003. Joseph Kirk to E. I. du Pont de Nemours & Co.

Manufacture of self-lustering, aqueous emulsion-type wax polish, process of emulsifying wax while maintaining low viscosity of fluid during emulsification and avoiding formation of intermediate water-in-wax emulsion stage. No. 2,395,025. Helen Wassell to Carbine & Carbon Chemicals Corp.

In bituminous product, a plastic composition consisting of coal-digestion pitch containing heavy water gas tar heavy oil derived from heavy water gas tar obtained in carburetting a gas with residual petroleum fuel oil in a water-gas generator plant. No. 2,395,041. William Fair, Jr. to Koppers Co. Inc.

Scouring and cleansing device comprising matted hemp fibers formed into pad-like unit, impregnated with mixture containing soap, a resinuous material and scouring powder. No. 2,395,068. Lewis Rimer to James H. Rhodes & Co.

Mineral oil composition comprising viscous mineral oil fraction having in admixture to retard rust- and emulsion-forming characteristics of oil fraction, an oil-soluble alcohol extract of blown lard oil and to retard deleterious effects of oxidation upon oil fraction, the condensation product of ethylaniline and formaldehyde. No. 2,395,093. John Bishop to Socony-Vacuum Oil Co. Inc.

Crankcase lubricant comprising lubricating oil dissolved therein metal salt of an arylsulfonamide. No. 2,395,105. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

Producing cord of high asbestos content which comprises continuously passing feed cord through bath containing adhesive, then passing cord through vertically elongated treating zone, transporting finely-divided asbestos fibers in suspension in gaseous medium to zone. No. 2,395,157. Lincoln Work and David Mathias to Metal & Thermit Corp.

Producing luminescent dial, which comprises producing screening base comprising organic binder, including resin and drying oil, a solvent for binder, luminescent pigment, and insoluble soap as sharpener. No. 2,395,185. Sampson Isenberg and Rudolph Hultgren to General Luminescent Corp.

Thermoplastic tape made to overlap and secure together abutted edges of backs of pieces of pile floor coverings and to be adhered thereto by applied heat of hot iron. No. 2,395,257. Ara Dildilian to Bigelow-Sanford Carpet Co. Inc.

Buoyant element comprising normally impermeable outer casing enclosing body of filling composed of light-weight finely divided water-insoluble solid substance, particles of which present surfaces of a water-repellent and water-insoluble fatty acid compound. No. 2,395,266. Henry Gardner.

Composition sheet for shoe soles and like, containing scrapped golf ball cover stock, refined balata, and ground cork. No. 2,395,294. William Quinn.

Inhibiting color change of wood during seasoning thereof with urea, which comprises contacting wood with composition consisting of urea, sodium bisulfite and boric acid and water. No. 2,395,311. John Woodhouse and Clarence Bell to E. I. du Pont de Nemours & Co.

Lubricant for low temperatures consisting of benzaldehyde. No. 2,395,379. John Morgan to Cities Service Oil Co.

Synthetic lubricating oil comprising homogeneous liquid solution of tri ortho cresyl phosphate, ethylene glycol mono benzyl ether, and tri ortho butyl phosphate. No. 2,395,380. John Morgan and Russell Lowe to Cities Service Oil Co.

Stable motor gasoline consisting of normally stable gasoline type motor fuel containing tetra-alkyl lead to render mixture unstable on storage, and stabilizing amount of mixture of 2,4-dimethyl-6-tertiary butyl phenol and phenylene diamine. No. 2,395,382. Ernest Walters to Shell Development Co.

Pressure-sensitive nonfibrous sheet, film or tape comprising base film having on one side a pressure-sensitive adhesive coating and on other side a coating which does not adhere to adhesive coating and which comprises aminophosphatide. No. 2,395,419. James Mitchell to E. I. du Pont de Nemours & Co.

Insecticidal and fungicidal composition containing formaldehyde-ammonium aryl dithiocarbamate interaction product obtained by reacting formaldehyde with an ammonium aryl dithiocarbamate. No. 2,395,440. Arthur Ainley and William Davies to Imperial Chemical Industries Ltd.

Composition comprising plant hormone material and from levulinic acid, and sodium, calcium, and ammonium salts of levulinic acid. No. 2,395,446. Watson Benson.

Lubricating composition comprising lubricating oil and synthetic material obtained by condensing homogeneous monochloro-wax with anhydrous

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sodium orthochlorobenzoate in presence of acetic anhydride and pyridine. No. 2,395,457. Gordon Byrkit to The Lubri-Zol Development Corp.

Gasket lining composition for lining joints of sheet metal containers which hold cleaning fluids and like, consisting of homogenous mixture of alcohol soluble zein and cellulose nitrate, glycol phthalate as a plasticizer, titanium dioxide and carbon black as filler and coloring material and compatible solvent. No. 2,395,502. John Robinson and Paul Millelot, Jr. to American Can Co.

Producing soluble oil from petroleum hydrocarbon starting material having lubricating oil consistency and containing naphthenic constituents providing one naphthenic ring per molecule and aromatic constituents insufficient to inhibit oxidation. No. 2,395,627. Herbert Johnson and John Perrine to Sun Oil Co.

Dampener for lithographic printing or graining which comprises, solution of water, ammonium dichromate, gum arabic and a wetting agent having penetrability greater than water. No. 2,395,654. Thomas Brannigan, Gordon Raison and William Yoder to General Motors Corp.

In roll of double-coated pressure-sensitive adhesive tape, interwound liner of creped paper impregnated and coated on both sides with fused and homogeneous non-bleeding composition comprised of mediumethoxy ethyl cellulose and hydrogenated castor oil wax and higher fatty acid. No. 2,395,668. Waldo Kellgren and Warren Hurd to Minnesota Mining & Manufacturing Co.

Producing hydrocarbon oil solution of alkaline earth metal sulphonate. No. 2,395,713. Carroll Barbour to The Atlantic Refining Co.

Preparing sulfonic acid metal soaps which comprises reacting hydrocarbon lubricating oil with sulfuric acid and forming reaction mixture comprising sulfonic acids dissolved in unreacted oil, adding mixture compound of said metal to adjust pH of mixture within 9.5 and 5.0, etc. No. 2,395,774. Earl Amott and Wallace Grebe to Union Oil Co. of California.

Bituminous paint composition comprising bituminous base material obtainable by heating digestion medium containing heat-liquefiable tar and pitch constituents with bituminous coal and by dispersing in coal and digestion medium product a heavy water gas tar heavy oil, and base material having admixed therewith low-boiling solvent preponderantly aromatic. No. 2,935,853. William Fair, Jr. to Koppers Co. Inc.

Lubricant comprising oil of lubricating viscosity and salt of a sulfurized high molecular weight carboxylic acid, said carboxylic acid sulfurized by reaction with sodium trisulfide. No. 2,395,889. Bert Lincoln and Gordon Byrkit to Socony-Vacuum Oil Co. Inc.

Corrosion-resistant packing comprising: strip of polyvinylidene chloride foil twisted upon itself to form core, and strip of silver foil coated with finely divided graphite wrapped around core. No. 2,395,935. Ralph Morgan and Paul Curry to Durametallic Corp.

Detergent composition in cake form consisting of reaction product of 1,3-dioxolane with water-insoluble hydrophobic organic oxygenated compound, which prior to addition of 1,3-dioxolane group contained reactive hydrogen atom, and sudsing agent from sulfonated higher fatty alcohols, soaps, Turkey-red oil, saponine, and aliphatic and aromatic organic sulfonic acids. No. 2,395,971. Donald Loder to E. I. du Pont de Nemours & Co.

Making sealing composition for concrete road joints, which consists of blending asphalt, combined with intermediate oil containing practically no paraffin, and practically no sulphur. No. 2,395,996. John Doyle, deceased, by Mary Doyle, administratrix.

Repelling insects comprising applying to area insect repellent composition containing 2-ethyl-n-capronic acid. No. 2,396,012. Howard Jones and Bernard Travis, dedicated to the free use of the People of the United States.

Insect repellent composition comprising 2-phenyl-cyclohexanol incorporated in carrier. No. 2,396,013. Howard Jones and Bernard Travis, dedicated to the free use of the People of the United States.

Insecticide comprising carrier of finely divided fibrous, organic material dyed with salt of an acid azo dye and nicotine. No. 2,396,019. Charles Murray to the Secretary of Agriculture of the United States of America.

Insecticidal solution comprising pyrethins I and II and isopropyl alcohol and kerosene. No. 2,396,054. Orville McKim to Stanco Inc.

Simulated patent leather having fatigue resistance before cracking higher than about 3,000,000 cycles, and having polished surface with specular gloss of at least 3% reflection comprising in sheet form an elastic gel having following composition: conjoint polymers of vinyl chloride with vinyl acetate resin, heat stabilizer, lubricant, plasticizer, pigment. No. 2,396,125. John Price to Carbide & Carbon Chemicals Corp.

Instrument lubricant consisting of dibutyl phthalate 50%, tributyl phosphate 40%, polymerized mixture of octyl and decyl esters of methacrylic acid 10%. No. 2,396,191. John Morgan and Russell Lowe to Cities Service Oil Co.

Dental instrument oil consisting of decolorized mineral oil and octyl and decyl esters of methacrylic acid polymerized to molecular weight of 15,000. No. 2,396,192. John Morgan and Russell Lowe to Cities Service Oil Co.

Soft friable luminescent marking crayon comprising hemihydrated calcium sulphate and luminescent material of sulphide type held together with a water-soluble binder. No. 2,396,219. Lawrence Weagle to Radio Corp. of America.

Extreme pressure lubricating composition comprising mineral oil, film strength of which increased by inclusion of dixylyl disulphide in which portion of sulphur is on alkyl group. No. 2,396,223. Carl Prutton to The Lubri-zol Corp.

Preventing corrosion of aluminum fuel tanks containing mixture of water and leaded gasoline, which comprises adding to mixture 0.1% to 1% of isopropyl alcohol ester of oxidized-wax fatty acids. No. 2,396,236. Emile Baldeschwieler and John Zimmer to Standard Oil Development Co.

Liquid mixture of compounds of formula given in patent. No. 2,396,261. Jesse Harmon to E. I. du Pont de Nemours & Co.

Fungicide which comprises 4-chloro-3,5-dimethylphenyl hydrogen camphorate. No. 2,396,264. Max Huffman to U. S. Standard Products Co.

Detergent composition comprising sodium salt of a sulphonated alkyl. No. 2,396,278. Otto Lind to The Procter & Gamble Co.

Luminescent material and process of preparing same. No. 2,396,298. Mark Swanson.

Shoe part having single sprayed temporary protective coating comprising vinyl resin and plasticizer therefor formed in situ directly upon it, said coating adhering while shoe part is being subjected to various manufacturing operations but capable of being readily peeled off. No. 2,396,313. John Brophy to United Shoe Machinery Corp.

Waterproofing composition comprising chlorinated rubber, polyterpene resin, water-insoluble and water-repellent metal soap, fatty glyceride plasticizing agent, and volatile sovent. No. 2,396,342. Augustus Quick.

Preparing stable sulphurized mineral oil comprising sulphurizing oil with elemental sulphur at 300° F. to 360° F. and adding complex glyceride phosphoric acid to inhibit formation of sediment in sulphurized oil. No. 2,396,345. Thomas Rogers and Joseph Wallace to Standard Oil Co.

Cutting compound for threads, glass and like consisting of white lead dissolved in melted paraffin, linseed oil, turpentine, all formed into emulsion with water. No. 2,396,403. James Williams, deceased, by Ethel Williams, administratrix.

Acidproof cement comprising reaction product of alkali titanium fluoride and alkali silicate from sodium silicate and potassium silicate, and filling agent resistant to action of acids. No. 2,396,509. Emanuel Hertzell and Richard Anderson to The Tobinson Clay Product Co.

Killing weeds which consists in apply to weeds a substance selected from phenoxy, phenylmercapto, phenylimino, naphthoxy, naphthylmercapto, and naphthylimino monocarboxylic aliphatic acids, their salts and esters. No. 2,396,513. Franklin Jones to American Chemical Paint Co.

Making flame-resistant noncombustible composition having property of carbonizing into greatly enlarged heat insulating mass comprising, dissolving pure stump resins in gasoline type solvent, extracting color bodies from solution, etc. No. 2,396,575. Henry Kauth.

Preparing calking compound which comprises heating polyvinyl acetal to 185° F., adding dispersing agent comprising mixture of casein and sodium oleate and adding water. No. 2,396,607. Thomas Rogers, Jr. to Wingfoot Corp.

Paste consisting of mixture of polyurethane prepared by condensing alpha omega hexanediisocyanate with 1.4 butylene glycol, 3-chloropropyleneglycol (2)-phenylether (1) as plasticizer, zinc white, and ethylenechlorohydrin. No. 2,396,621. Kurt Thinius.

* *Textiles*

Scouring wool which consists in washing wool in two successive baths each of which contains soap and soda ash in solution in same concentration, each bath containing in addition ordinary unrefined kerosene and pine oil. No. 2,395,085. Samuel Woodside to Lucson Corp.

Felted wood fiber cord-substitute material comprising acid-free coniferous fibers, excluding red fir, red wood and red and white cedar, said fibers mixed with and bonded together by partially hyrated chemical wood pulp. No. 2,395,218. Joseph Gauthier.

Apparatus for liquid treatment of cakes of artificial thread comprising tubular perforated holder and soft permeable sheath of elastic material such as rubber, surrounding holder. No. 2,395,256. Desiré Devos to Courtaulds Ltd.

Producing high tenacity filaments, yarns, and threads of themoplastic cellulose derivatives wherein preformed filaments of thermoplastic cellulose derivatives are softened by heat and stretched, improvement which comprises applying to filaments prior to heat a liquid composition to prevent sticking of filaments while in softened condition. No. 2,395,396, Rollin Conaway to E. I. du Pont de Nemours & Co.

Treating textile material containing animal hair to reduce liability to felt which comprises impregnating material with synthetic resinous substance as a resist, and then treating with non-resinous chemical antifelting agent. No. 2,395,724. John Cowley to Tootal Broadhurst Lee Co. Ltd.

Stabilizing wool with respect to laundry shrinkage, which comprises treating wool with alcoholic caustic solution partially to reduce felting quality of wool, then with synthetic resin-forming material in water dispersion and curing said resin-forming material to insolubilize it. No. 2,395,791. Edward Pfeffer and Walter Kitaj to Cluett Peabody & Co. Inc.

Fire-proofing and glow-proofing textile material which comprises impregnating same with coumarone-indene resin and water-insoluble solid antimony compound selected from antimony oxide and antimony sulphide. No. 2,395,922. William Timmons.

* *Water, Sewage, and Sanitation*

Water-treating composition in form of water-soluble glass consisting of Na_2O, Al_2O_3 and P_2O_5, said composition being represented by area of trilnear diagram of compositions of Na_2O, Al_2O_3 and P_2O_5. No. 2,395,126. Charles King to Blockson Chemical Co.

Treatment of boiler water by inhibiting adherent deposits in turbine from solids contained in steam carried over from boiler, consisting in adding sodium chloride to water in boiler. No. 2,395,260. Harold Farmer and Sheppard Powell.

Maintenance of potassium conditioning of boiler water. No. 2,395,331. Charles Kaufman to Hall Laboratories, Inc.

In water treating apparatus, a circular tank structure flat bottom thereof, annular, concentric partition extending from bottom to top of said tank structure, radial partitions, etc. No. 2,395,508. Robert Seddig to Graver Tank & Mfg. Co.

Removing salts from water which comprises subjecting water to treatment first with hydrogen exchange body and subsequently with anion removal body composed of insoluble resin containing guanidyl group condensed with aldehyde. No. 2,395,825. James Hesler to Infilco Inc.

Removing positive ion silica from water having pH value above 7 and below 10, which comprises subjecting water to treatment with floc of metal hydroxide from ferric hydroxide, ferrous hydroxide, aluminum hydroxide and mixtures thereof. No. 2,396,220. William Wilson ond Howard Dole to Monsanto Chemical Co.

Agricultural

Recovery of gum constituents from asclepiadaceae and product. No. 2,397,611. Boris Lougovoy and Carl Hartwig.

Treating proteinaceous material contained in soybeans to obtain decolorized protein for use in paper coatings, which includes washing material as oil-free meal or flake with aqueous solutions of sulfur dioxide, etc. No. 3,397,307. Merrill Youtz to The Drackett Co.

* *Continued from Vol. 583, Nos. 3, 4, Vol. 584, Nos. 1, 2.*

From Official Gazette—Vol. 584, Nos. 3, 4—Vol. 585, Nos. 1, 2 (March 19-April 9)—p. 689

Solution of zein in mixture of water and water-miscible solvent from methyl alcohol, ethyl alcohol, isopropyl alcohol and acetone, from which solution zein tends to gel containing water-soluble thiocyanate to retard increase in viscosity of zein solution upon standing. No. 2,397,919. John Caldwell to Eastman Kodak Co.

Composite resilient batting for mattress and stuffing purposes comprising cotton fibers and bast fibers of redwood bark. No. 2,398,159. Harmon Riehl to The Pacific Lumber Co.

Biochemical

Preparing sex hormones. No. 2,397,424. Russell Marker and Eugene Wittle to Parke, Davis & Co.

Producing progesterone, comprising treating delta^4-pregenone-20 with chromic anhydride. No. 2,397,425. Russell Marker and Eugene Wittle to Parke, Davis & Co.

Preparing sex hormones. No. 2,397,426. Russell Marker and Eugene Wittle to Parke, Davis & Co.

Means for dewatering yeast suspension, comprising rotatable drum constituting filter chamber and including perforated wall section through which filtered liquid may pass, means for establishing superatmospheric gas pressure in chamber, etc. No. 2,397,436. Esen Rosenqvist to Svenska Jastfabriks Aktiebolaget.

Retarding development of rancidity in non-stable vegetable glyceride oils and animal glyceride fats, comprising adding to them tocopherol plus enzyme, selected from trypsin, pepsin, and clarase. No. 2,397,920. Mayne Coe, Jr. and Mayne Coe, to the Secretary of Agriculture of the United States of America.

Producing glue from bones. No. 2,397,973. Camillo Mueller.

Reducing isoelectric point of gelatin having isoelectric point above pH 5, which comprises treating gelatin at 30° C. to 60° C. with alkaline hydroxide at pH greater than 8, then neutralizing alkali and washing gelatin. No. 2,398,004. Robert Houck, John Russell, and Samuel Sheppard to Eastman Kodak Co.

Obtaining antithrombin-free thrombin which comprises reacting in aqueous medium antithrombin-free thrombo-plastin with antithrombin-free prothrombin in presence of calcium ions. No. 2,398,077. Harry Smith to Parke, Davis & Co.

Recovering a gonadotropic substance from urine. No. 2,398,185. John Lee and Frank Stirn to Lederle Laboratories, Inc.

Removal of undesirable tastes and odors from fat-soluble vitamin-containing materials and for stabilization of materials against oxidative changes, which comprises mixing fat-soluble vitamin-containing material from fish oils, fish liver oils and concentrates thereof with crude vegetable oil and heating mixture. No. 2,396,679. Loran Buxton to National Oil Products Co.

Granular, ungelatinized, amylaceous reaction product formed by roasting partially converted partially cold water soluble amylaceous conversion product under non-gelatinizing conditions with aldehyde from formaldehyde and acetaldehyde until product is obtained which swells and forms short, soft pastes in cold water without granular disorganization. No. 2,396,937. Hans Bauer, Jordan Bauer, and Don Hawley to Stein, Hall & Co. Inc.

Cellulose

Formaldehyde-cellulose compound soluble in aqueous alkali solutions and consisting of coagulated, washed and dried reaction product of alkali-cellulose and formaldehyde. No. 2,397,437. John Rust and William Van Delden to Montclair Research Corp.

Regenerating cellulose in shaped form from viscose solution having dispersed therein high molecular weight, macromolecular, polymeric material containing at least six structural groups. No. 2,397,454. Harold Woodward to E. I. du Pont de Nemours & Co.

Lining materials comprising discrete, non-fibrous and cellular particles of regenerated cellulose united by binding agent comprising cellulose acetate and having incorporated a hygroscopic material comprising glycerine. No. 2,398,049. George Schneider and Mervin Martin to Celanese Corp. of America.

Ceramics

Glass-making furnace of tank type comprising refractory container for molten glass-making materials, doghouse connected to container and having wall in common, etc. No. 2,397,852. Eugene Gentil to Societe Anonyme des Manufactures des Glaces & Produits Chimiques de Saint-Gobain, Chauny & Cirey.

Grinding cement clinker, which comprises grinding clinker in presence of saturated aliphatic compound, consisting of carbon, hydrogen, hydroxyl groups and one member of sulfate, sulfonic acid, sulfonate, halogen, nitro, nitroso and hydroxyl groups. No. 2,397,886. Edward Scripture, Jr.

Transparent soda-lime-silica heat absorbing glass produced from batch containing following ingredients: sand, limestone, soda ash, salt cake, salt (sodium chloride), borax, fluorspar (calmium fluoride), iron scale, and powdered charcoal. No. 2,397,195. Glenn Mook and Richard Ricker to Libbey-Owens-Ford Glass Co.

Composition for making molds for castings, comprising pulverulent ceramic material and binder therefor comprising aqueous dispersion of hydrophilic cellulosic material selected from cellulose ethers, cellulose xanthate, cuprammonium cellulose, and alkali-soluble degraded regenerated cellulose. No. 2,398,047. Bernard Schmidt.

Condenser dielectric having high dielectric constant and predetermined temperature coefficient of dielectric constant and comprising vitrified crystalline mass of titanium dioxide, compound of rare earth of high dielectric constant, and flux which aids in reducing porosity. No. 2,398,088. George Ehlers and Rolland Roup to Globe-Union Inc.

Enamel composition comprising frit and oxy-compound of class of antimony and arsenic, said frit containing alkali metal oxide, silica and cerium oxide. No. 2,396,856. Burnham King, Jr. to The Harshaw Chemical Co.

Lead borosilicate glaze composition for decorating glassware, having fusing temperature not higher than 640° C. and exhibiting superior alkali resistance, said composition comprising lead borosilicate and also containing material of class of pentoxides of columbium and tantalum, and columbates and tantalates of barium, strontium, calcium, etc. No. 2,396,873. Robert Morrison and William Morris to The Harshaw Chemical Co.

Lead borosilicate glaze composition for decorating glassware, comprising lead borosilicate and also containing material of class of oxides of thorium, praesodymium, neodymium and lanthanum and mixtures thereof. No. 2,397,004. Carl Harbert, Francis Ellinger and William Morris to The Harshaw Chemical Co.

Lead borosilicate glaze composition for decorating glassware, comprising lead borosilicate composition containing material of class of fluorides of thorium praesodymium, neodymium and lanthanum and mixtures thereof. No. 2,397,005. Carl Harbert and William Morris to The Harshaw Chemical Co.

Coatings

Making oleo-resinous metal surface coating composition having improved covering and levelling characteristics and for rapid drying, comprising cooking varnish type resin in fast drying oil of high iodine value, and incorporating in solution normal tri-alkyl phosphate functioning as powerful wetting agent and as strong solvent of narrow boiling range. No. 2,397,179. Herbert Wolfe to American Can Co.

Transparent coating for reducing reflection of radiant energy from surface into adjacent medium, said coating comprising plurality of continuous layers, one of layers being of material of higher index of refraction than support medium, another being of material of lower index of refraction than support medium, and a third of compound including thorium and fluorine. No. 2,397,929. Glenn Dimmick to Radio Corp. of America.

Forming protective coating upon paper sheet which comprises depositing thereon in molten fully-fluid condition a low-melting composition consisting of heat stable ethyl cellulose having ethoxyl content of 45-55% and stable compatible high molecular weight plasticizer. No. 2,398,042. Martin Salo to Eastman Kodak Co.

Coating travelling web of sheet material with thermoplastic material having higher viscosity when melted than wax mixtures used in carbon coating and having softening and melting points sufficiently high that materials, when set, can be handled and will not offset or transfer at normal room temperatures. No. 2,396,946. William Grupe to Interchemical Corp.

Dyestuffs

Azo compounds. No. 2,397,927. Joseph Dickey and James McNally to Eastman Kodak Co.

Indigoid coloring compounds. No. 2,397,928. Joseph Dickey and James McNally to Eastman Kodak Co.

Continuous vat dyeing solid colors on textile materials which comprise applying to textile a pigment from unthickened water suspension or dispersion, removing water by squeezing and heating, and immediately subjecting dried heated textile to alkaline reducing agent, and squeezing fabric to obtain penetration of reducing agent and contact with pigments in fabric. No. 2,396,908. Glenn Womble to Riverside & Dan River Cotton Mills, Inc.

As a dye intermediate, a monomeric amide of formula described in patent. No. 2,396,917. William Hanford, James Kirby and David Woodward to E. I. du Pont de Nemours & Co.

Cyanine dyestuffs and dyestuff intermediates. No. 2,397,013. John Kendall to Ilford Ltd.

Cyanine dyestuffs. No. 2,397,014. John Kendall to Ilford Ltd.

Equipment

In steam generator, combustion chamber having walls thereof defined by steam generating tubes, fuel burning means for combustion chamber, etc. No. 2,397,523. Ervin Bailey to The Babcock & Wilcox Co.

Mass spectrometer provided with means for converting molecules into ions, and analyzer, a collector, means for impressing potential upon ions to propel them through analyzer toward collector, etc. No. 2,397,560. Raymond Olesen to Consolidated Engineering Corp.

Apparatus for performing adsorption process and including adsorption zone for passage therethrough mixture of gases and finely divided solid adsorbent material to adsorb one of gases of mixture, and separator connected to said zone to receive and separate material bearing adsorbed gas and unadsorbed gases, etc. No. 2,397,566. August Schutte to The Lummus Co.

Electrode stem clamp. No. 2,397,806. John Quinn and Roy Horst to The Solvay Process Co.

Gas absorption apparatus comprising U-tube having in one leg an enlargement forming container for absorption liquid and in other leg a displacement receptacle, etc. No. 2,397,845. Harry Dietert.

Apparatus for analysis of gas. No. 2,397,846. Harry Dietert.

Carburetted water gas set comprising generator adapted to contain ignited fuel bed, carburetter and superheater connected in series, etc. No. 2,397,138. John Haug to United Engineers & Constructors, Inc.

Filter for vaporized gasoline comprising body portion having depressed annular chamber in its upper face and central bore forming inlet at its lower end and having radially arranged ports connecting said bore and said chamber, etc. No. 2,397,142. Styles Howard.

Volatile liquid vaporizer comprising upright rotary shaft, series of annular rotors of disc-like solid form and porous material fitted on shaft in superposed spaced-apart relation, etc. No. 2,397,230. Joseph Armathes, thirty per cent to Anthony Shipula and thirty per cent to Ben Goldberg.

Collecting electrode for liquid-flushed electrical precipitators. No. 2,397,302. Floyd Viets to Western Precipitation Corp.

Apparatus for treatment of carbonaceous materials comprising retort having elongated, closed vertical chamber, and steam jacket enclosing chamber, etc. No. 2,397,432. Elmer Records.

Connector for securing together two pieces of tubing having complementary interengaging end portions providing ball and socket joint therebetween, said connector comprising pair of flat body members each longitudinally bifurcated at one end and having operating handle portion at other end, etc. No. 2,397,438. Leopold Schmid to Arthur H. Thomas Co.

In apparatus for evaporating and distilling liquids, housing structure comprising boiler adapted to contain body of water operatively hermetically sealed therein and comprising fluid fuel burner and stack outlet mounted exteriorly thereof, etc. No. 2,398,068. Eugene Worthen and Fenner Barbour to Buena Vista Iron Co.

In separator for extracting liquid from mixture of liquid and gas, a cylindrical body portion, enclosing shell to conduct heat away from body, circular peripheral groove formed between body and shell adjacent one end of device, etc. No. 2,398,090. Walter Freeman to Wagner Electric Corp.

Machine for forming tablets or other articles from powdered material by compression. No. 2,398,146. Henry Kerfoot.

Apparatus for distillation. No. 2,398,184. Robert Kleinschmidt to Arthur D. Little, Inc.

Adjustable automatic pipette comprising reservoir, chamber below same, conduit depending from reservoir and communicating with lower portion of chamber, piston in chamber, being adjustable to vary capacity of chamber. No. 2,398,234. Wendal Long to Horton & Converse.

Collapsible distillation apparatus. No. 2,398,291. William Delano to Gallowhur Chemical Corp.

Solar distillation apparatus comprising enclosure formed of single rectangular sheet of transparent water resistant material folded upon itself midway and sealed at edges to form enclosure, resulting layers being incompletely secured together along transversely extending lines to form three superimposed communicating chambers, etc. No. 2,398,292. William Delano to Gallowhur Chemical Corp.

Means for indicating level of granular material in bin comprising: flat topped beam member extending transversely of bin, pivot mounting, suspension member supporting opposite end of beam including suspension link made of metal whose electrical conductivity changes in response to mechanical loading to which it is subjected. No. 2,398,334. Edward Sinclair and William Hagerbaumer to Socony-Vacuum Oil Co., Inc.

Electric arc furnace comprising shell having discharge spout at side thereof and mounted so that it may be tilted for discharge purposes, etc. No. 2,396,663. Hugo Kuchithau, Charles Vokac and Michael Del Monte to Whiting Corp.

Apparatus for spray crystallizing substances from their solutions which comprises cylindrical chamber having axis and being closed by circular cover at one end and by crystal collecting con-shaped member at other end, etc. No. 2,396,689. Charles Davis to American Cyanamid Co.

Filter structure comprising filtering body of wound fibrous material and fabric covering shrunk in place thereon comprising filamentary material of copolymer of vinyl acetate and vinyl chloride. No. 2,396,712. William Luttge and Emmanuel Mesthene to American Viscose Corp.

In clarification filter, combination of filter bed formed of particles to to be raised by magnetic action, traveling cleaner therefor, means within cleaner including electromagnetic for raising, holding and dropping mass of particles by magnetic action to facilitate removal of objectionable matter, etc. No. 2,396,779. Charles Fraser.

Torch for welding thermoplastic material. No. 2,396,968. William Phillips, Jr. to The Udylite Corp.

Device for determining size of particles in liquid suspension by measurement of rate of change of specific gravity of such suspension brought about by settling of particles, said device having balance having one arm movable with such change in gravity, a counterpoise and means actuated by counterpoise for measuring rate of change. No. 2,397,038. Noel Obenshain and Wright Welton to West Virginia Pulp & Paper Co.

Device of Geiger counter type for detecting gamma radiation, comprising metallic plate member forming cathode, said plate being provided with hole, and anode member comprising wire extending through hole and insulated from cathode plate. No. 2,397,071. Donald Hare to The Texas Co.

Radiation detector. No. 2,397,072. Donald Hare to Texaco Development Corp.

Radiation detecting device of counter type. No. 2,397,073. Donald Hare and Gerhard Herzog to The Texas Co.

Detector of gamma radiation comprising rectangular frame, second rectangular frame within and at right angles to first frame, plurality of cathode plates supported in parallel spaced relation by two opposite sides of first frame, and plurality of anode wires supported by two opposite sides of second frame. No. 2,397,074. Donald Hare and Gerhard Herzog to The Texas Co.

Detector of penetrative radiation in which cathode and anode are disposed in gas filled housing and connected to source of high electrical potential, means for minimizing leakage between cathode and anode comprising electrical insulators, etc. No. 2,397,075. Donald Hare and Gerhard Herzog to The Texas Co.

Explosives

Explosive containing NH_4NO_3, alkali metal nitrate, and mixture of non-volatile organic liquid combustible and solid combustible agents in intimate admixture, fineness of solid components being so controlled that 95% passes through a 60 mesh screen and moisture content being restricted to .20% so that detonation can be accomplished by cap not stronger than No. 8. No. 2,398,071. Jacob Barab.

Nitrating hexamethylenetetramine which comprises contacting it with solution of nitrogen pentoxide dissolved in non-aqueous solvent. No. 2,398,080. George Caesar and Max Goldfrank to Stein, Hall & Co., Inc.

Food

Salt fish laid down with sea salt protected from red bacillus by distribution of particles of acid phosphate upon and between exposed surfaces of salt crystals. No. 2,397,547. Herbert Hempel, deceased, by Herbert K. Hempel, administrator, to Gorton-Pew Fisheries Co. Ltd.

Inadhesive plastic nut butter comprising homogeneous mass of comminuted nuts containing aqueous dispersion of wetting agent. No. 2,397,564. Joseph Rosefield, Jerome Rosefield and Marvin Rosefield.

Treating cocoa beans which comprises acidulating beans, roasting beans and then neutralizing acid and further roasting beans, the acid and neutralizing agent reacting to form water soluble-non-toxic product. No. 2,397,402. Leon Benedict to United-Rexall Drug Co.

Protecting against rancidity edible vegetable, animal, and fish oils, fats, and waxes, by incorporating therein a beta mercaptopropionic compound having formula ROOCCH2CH2S-X in which R is from hydrogen and hydrocarbon groups and X is member of hydrocarbons, oxygenated-, sulfur-, sulfur- and oxygenated-, and sulfur- and nitrogen-hydrocarbons. No. 2,397,960. Myers Gribbins and Frederick Miller, Jr. and Daniel O'Leary to E. I. du Pont de Nemours & Co.

Stabilization of fats and oils which comprises protecting against rancidity edible vegetable, animal, and fish oils, fats, and waxes, by incorporating therein, compound selected from thio di-fatty acids and their esters. No. 2,397,976. Daniel O'Leary to E. I. du Pont de Nemours & Co.

Inorganic

Producing luminescent zinc cadmium sulfide, which comprises first producing luminescent zinc cadmium sulfide, then mixing this with substance of class of zinc sulfide and cadmium sulfide, and firing mixture. No. 2,397,666. Sampson Isenberg to General Luminescent Corp.

Thermo-electric couple having positive thermo-electric element comprising fused material containing silver, copper, selenium, sulfur, and tellurium, and negative thermo-electric element comprising fused material containing copper, silver, tellurium, selenium, and sulphur. No. 2,397,756. Ernst Schwarz.

Recovering hydrogen halide from admixture with other gases which comprises contacting hydrogen halide-containing gas with suspension of anhydrous metal salt having high absorption capacity for hydrogen halide, supported as thin film on light carrier suspended in anhydrous liquid of organic character. No. 2,397,760. Albert Shmidl to Standard Oil Development Co.

Recovering hydrogen halides from mixtures with other gases which comprises contacting hydrogen halide-containing gas with slurry of anhydrous metal salt from cuprous chloride and cupric sulfate in hydrocarbon liquid. No. 2,397,768. Edward Wadley to Standard Oil Development Co.

Manufacture of inorganic oxide gel in hard glassy spheroidal particles which comprises causing gelation of globules of inorganic oxide hydrosol in body of water-immiscible liquid, washing spheroidal particles and thereafter drying hydrogen particles by passing superheated steam at 215° F. to 350° F. in contact with washed hydrogel particles. No. 2,397,350. Kenneth Hayden and Peter Valas and Henry Daley to Socony-Vacuum Oil Co. Inc.

Bleaching of shellac, which comprises subjecting material to action of aqueous solution of chlorite of alkali and alkaline earth metals and soluble hypochlorite at pH not less than 7. No. 2,397,389. George Vincent to The Mathieson Alkali Works, Inc.

Reduction of molybdenum trioxide comprising heating in reducing gas weak enough to slowly effect partial reduction and when reduction to molydenum dioxide is nearly complete increasing strength of gas employed. No. 2,398,114. Robert Rennie to Westinghouse Electric Corp.

Dehydrating caustic solutions, without adding metallic impurities thereto. No. 2,396,664. Edward Ladd.

Treating molten metal chloride bath containing nickel chloride to remove nickel content as metallic nickel which comprises incorporating in bath a finely divided metallic material consisting in part of metal higher than nickel in solid metal-molten metal chloride displacement series. No. 2,396,792. William Kroll.

Manufacture of normal magnesium carbonate from magnesium bicarbonate solution which comprises decomposing magnesium bicarbonate solution with liberation of carbon dioxide and formation of normal magnesium carbonate by subjecting solution to sustained heating. No. 2,396,915. Harold Greider and Roger MacArthur to The Philip Carey Manufacturing Co.

Medicinal

Producing tocopherol-like compounds which comprises reacting compound from para-unsubstituted chromans and coumarans to form corresponding para-halo compound and replacing para-halogen substituent with hydroxyl group to form corresponding para-hydroxy tocopherol-like compound. No. 2,397,212. Lee Smith to Regents of the University of Minnesota.

Producing physiologically-standardized aqueous solution of curare for therapeutic use, steps of extracting dry, crude curare with dry, volatile, organic curare-solvent, transferring extracted material to aqueous solution, treating solution with activated carbon, and removing carbon. No. 2,397,417. Horace Holaday to E. R. Squibb & Sons.

Preparing alkaline-earth-metal salt of sulphadiazine which comprises reacting alkaline-earth-metal hydroxide with sulphadiazine in water, under carbon-dioxide-free atmosphere. No. 2,396,711. William Lott to E. R. Squibb & Sons.

Metallurgy, Ores

Applying tin alloy to article which comprises, preparing alkaline tin alloy plating bath containing stannate, arranging article to be coated as cathode within bath, etc. No. 2,397,522. Sydney Baier to The City Auto Stamping Co.

Cyclic process of recovering copper from dilute solutions of salts thereof comprising passing solution through bed of carbonaceous water insoluble cation exchanging material, regenerating material with excess of conc. hydrochloric acid to recover copper therefrom, and distilling regenerating effluent to recover free hydrochloric acid. No. 2,397,575. Howard Tiger and Paul Goetz to The Permutit Co.

Multi-layer metal composite reflector comprising transitory layer of copper-silver laminae in interfacial contact, said transitory layer having concave copper outer surface and convex silver innfer surface, electrodeposited rhodium layer on convex silver surface, electro-deposited ayer of platinum metal-other-than-rhodium on convex surface thereof, and supporting electrodeposited layer of non-noble metal, said transitory layer being adapted for separation whereby rhodium layer is exposed as optically correct reflectory surface. No. 2,397,583. Edmund Wise and Raymond Vines to The International Nickel Co. Inc.

Apparatus for extraction of metal from its ore by sublimation, comprising furnace, plurality of retorts mounted in transverse row in furnace, etc. No. 2,397,686. Arthur Ogren.

Workable alloys having 2.4 to 7.5% copper and 0.05 to 1% antimony, balance being zinc. No. 2,397,723. Edward Bunn to Revere Copper & Brass Inc.

Resulphurizing molten pig iron, which comprises treating molten pig iron under deoxidizing conditions in closed space with basic desulphurizing slag floating on pig iron. No. 2,397,737. Russell Heuer to Essex Research Corp.

Method of casting, which comprises pouring molten metal into mold having body of molten flux therein through ceramic conduit terminating above level of molten flux. No. 2,397,789. Robert Hopkins to The M. W. Kellogg Co.

Operating ingot heating furnace having two horizontal series of burners arranged on, in upper portion and one in lower portion of furnace, in conjunction with pair of regenerators. No. 2,397,810. Jay Roof.

Manganese ore reduction treatment. No. 2,397,824. Elmer Wanamaker, Robert Cromwell and Harold Chamberlain to Electro Manganese Corp.

From Official Gazette—Vol. 584, Nos. 3, 4—Vol. 585, Nos. 1, 2 (March 19-April 9)—p. 691

Producing molded article which comprises mixing metallic particles with hydrated metal hydroxide forming colloidal-like suspensions forming mixture to desired shape and heating shaped mixture in reducing atmosphere to reduce metal hydroxide to metal. No. 2,397,831. Harry Bellamy.

Apparatus for measuring molten metal temperatures. No. 2,397,901. William Zimmerman.

Apparatus for electroplating magnetizable spheroids comprising electroplating tank, electrolyte, anode, non-magnetic conducting plate forming portion of liquid retaining wall of tank opposed to anode and to serve as cathode contacting surface, plurality of magnets with pole of each next adjacent to plate but external of tank for maintaining electrical and rolling contact between plate and spheroids, etc. No. 2,397,177. Richard Wick.

Alloy steel containing carbon, silicon, copper, and beryllium, and characterized by low melting point and high physical properties. No. 2,397,222. Enrique Touceda and Ralph De Vries to Allegheny Ludlum Steel Corp.

Deep drawing chromium-killed steel other than steel containing phosphorus, containing carbon, manganese, chromium, iron and incidental impurities; said steel being free from deoxidizing elements. No. 2,397,244. Walter Crafts and Cecil Chadwick to Electro Metallurgical Co.

Producing ferrosilicon in combustion type metallurgical furnace where iron ore is reduced and melted by heat of combustion, charging iron ore containing silicon to furnace, charging fluxing agent to remove major portion of silicon in slag form and charging silica and metallurgical coke to furnace, coke having silica mechanically held in its structure to supply silicon in ferrosilicon product. No. 2,397,262. Charles Heist to National Steel Corp.

Producing metallic coatings by soldering end of stranded cable, which consists in immersing end portion in bath of molten metal, and subjecting end portion to high frequency mechanical vibrations while in bath. No. 2,397,400. Heinz Barwich.

Hollow metal bodies for refining of molten steel containing finely sized oxidic ores and consisting of metal pipe sections having deformed and sealed end portions. No. 2,397,418. John Howard.

Reducing metallic oxides which comprises continuously feeding charge mixture composed of finely divided metallic oxide with excess of finely divided coal into ignition and preparation tube of rotated forwardly declining furnace composite of two co-axially mounted tubes of which ignition and preparation tube is of lesser diameter and volumetric capacity than second and treating tube, etc. No. 2,397,993. Norman Urquhart to Combustion Processes Co.

Controlling temper of chromium-nickel stainless steel containing carbon and stronger-than-chromium carbide formers such as titanium, columbium, tantalum, etc., with its components that are ferrite formers proportioned to those that are austenite formers to cause production of stress-laden ferrite with any remainder austenite at low temperatures when steel cools to room temperatures. No. 2,397,997. Ernest Wyche and Raymond Smith.

Producing permanent magnet having desirable anisotropic properties, which comprises casting, with large casting runner in mould, a magnet alloy of precipitation-hardening type in contact with polar faces of metallic bodies connected in magnet circuit, whereby said bodies promote rapid initial rate of cooling in solidifying alloy and whereby heat of runner is utilized to effect slower rate of cooling. No. 2,398,018. Anthony Linley and Alan Torry.

Aluminum treating composition consisting of niter cake, anhydrous sodium chromate, and sodium fluosilicate. No. 2,398,078. Bland Button, Jr. and Joseph Janota, Jr. to The Diversey Corp.

Spraying metal onto surface of base material which comprises first coating surface with adhesive comprising 2-chlorobutadiene-1, 3, carbon black, zinc oxide, calcined magnesia, hexamethylene ammonium hexamethylene dithiocarbamate and composition containing primarily a phenolformaldehyde condensation product in solvent mixture of methylethyl ketone and mono-chlorobenzene, spraying film of metal onto coated surface, coating metal film with adhesive, spraying metal film onto second adhesive coating, and then curing. No. 2,398,108. Elmer Mott to Wingfoot Corp.

Electrode consisting of 6% to 12% of silver and balance being all lead and having on surface thereof coating of lead chromate and silver chromate having same conductivity in a chromic acid plating bath as underlying alloy. No. 2,398,110. Joseph Niles to Thomas J. Dee & Co.

Cold reduced steel sheet having invisible elastic paint, lacquer and enamel-bonding coating consisting of iron phosphate which imparts rust inhibiting properties without impairing natural bright metallic lustre, said coating containing between 0.015 and 0.040 gram of P_2O_5 per square foot of surface. No. 2,398,212. Charles Durgin to Monsanto Chemical Co.

Production of rare earth metal alloy flints for pyrophoric lighters, and having improved resistance to disintegration in air which includes casting rare earth metal alloy in ferrous metal mould, surface layers of which mould have been converted under oxidising conditions to continuous film of black iron oxide. No. 2,396,636. Harold Broadhurst to Imperial Chemical Industries Ltd.

Production of metals by thermal reduction of magnesium silicate ores containing oxides of plurality of metals of iron, chromium, nickel, silicon, aluminum, calcium, magnesium, zinc, and cadmium by reducing oxides of iron, chromium, nickel, silicon, aluminum or calcium present in one step and reducing oxides of magnesium, zinc, and cadmium in another step by silicon, aluminum and calcium contained in metals produced by first reduction. No. 2,396,658. Sven Hybinette and Francis Cary.

Processing of aluminum sheet material to attain uniformly large gain in surface area thereof, which consists in pretreating same in a caustic bath, then treating sheet material in etching acid bath. No. 2,396,685 George Coggins to Aerovox Corp.

Coating ferrous metal article with aluminum or aluminum alloys, which comprises forming initial molten surface coating of aluminum or aluminum-base alloys on article by immersing in bath of molten metal and then casting aluminum or aluminum-base alloys on initial coating while coating and article are at high temperature for coating to be wetted by casting metal to form permanent bond therewith. No. 2,396,730. Marshall Whitfield and Victor Sheshunoff to Al-Fin Corp.

Treating nickel and nickel alloys to remove associated metal impurities which comprises comminuting metal, suspending comminuted metal in molten metal chloride fusion consisting of chloride compound of metal high in displacement series of metals in system solid metal-molten metal chloride and passing gaseous chlorine into until associated metal impurities have been converted into metal chloride compounds. No. 2,396,793. William Kroll.

Treating impure nickel to remove associated metallic impurities which comprises comminuting nickel, mixing therewith anhydrous nickel chloride, compacting mixture and heating in inert and non-oxidizing atmosphere to convert associated metal impurities into metal chloride compounds. No. 2,396,794. William Kroll.

Drawn fine wire electrode for radio tubes consisting by weight of 1% to 2% aluminum, .66% to 3% tungsten, .05% to .5% carbon, and balance nickel and wire having greater hot strength and resistance to burn-out by electric heating in vacuum than wire of same size and same alloy without tungsten and carbon. No. 2,396,977. Emil Widell to Radio Corp. of America.

Protective coating in selective case hardening of ferrous metals consisting of alumina hydrate, boro-silicate flux, bentonite, and sodium silicate. No. 2,396,979. William Baldwin to Crane Co.

Heat resisting alloy containing carbon, chromium, nickel, cobalt, molybdenum, tungsten and columbium, and iron. No. 2,397,034. Gunther Mohling to Allegheny Ludlum Steel Corp.

Organic

Producing ethylbenzene which comprises contacting alkyl benzene containing at least three carbon atoms in alkyl group with catalyst consisting of hydrogen fluoride and boron fluoride. No. 2,397,495. Arthur Lien and Bernard Shoemaker to Standard Oil Co.

Esterification of salicylic acid by reaction of salicylic acid, in presence of boron trifluoride, with olefinic material from octene-1 and mixtures of refinery olefines boiling within 212-257° F., improvement which comprises increasing esterification of salicylic acid and minimizing alkylation of acid. No. 2,397,498. Robert May to Sinclair Refining Co.

Manufacture of naphthenhydroxamic acid which comprises adding solvent free compound from hydroxylamine and salts of hydroxylamine to mixture comprising ester of naphthenic acid and alcohol, and thereafter adding neutralizing quantity of base. No. 2,397,508. George Rouault and Herbert Rhodes to Standard Oil Co.

Producing diether of alkylene glycol, which comprises hydrogenating acetal of monoalkyl ether of alkylene glycol, in presence of active hydrogenation catalyst. No. 2,397,514. Charles Staff to Carbide & Carbon Chemicals Corp.

Preparing ethyl benzene, which comprises contacting benzene with aluminum chloride in atmosphere of ethylene. No. 2,397,542. Alfred Francis and Ebenezer Reid to Socony-Vacuum Oil Co. Inc.

Selectively separating cyclopentadiene from mixture containing cyclopentadiene, isoprene and piperylene which comprises subjecting mixture to fractional distillation. No. 2,397,580. Alger Ward to The United Gas Improvement Co.

Reacting acetobutyrolactone with ethyl nitrite, etc. to obtain de-methionine. No. 2,397,628. Harold Snyder to Merck & Co. Inc.

Preparing glycol dichloroformate. No. 2,397,630. Franklin Strain to Pittsburgh Plate Glass Co.

A bis (N-(carbalkenyloxy) aminoalkyl) ester of a dibasic acid which acid has two acid reacting OH groups each attached to carbonyl carbon atom, etc. No. 2,397,631. Franklin Strain to Pittsburgh Plate Glass Co.

Distilling polymerizable compound involving treatment of distillate in fractionation zone, improvement which comprises conducting the distillation and fractionation in presence of inhibitor for polymerization. No. 2,397,653. Edwin Erickson to The Mathieson Alkali Works, Inc.

Production of 3, 11-dihydroxy cholanic acid. No. 2,397,656. Thomas Gallagher and William Long to the Secretary of War of the United States of America.

Acylated guanylureas having general formula R·Y in which R is aromatic radical and Y is acyl-guanylurea radical. No. 2,397,667. Donald Kaiser and Jack Thurston to American Cyanamid Co.

Producing disubstituted malonylchlorides, which consists in treating with reagent of class of phosgene and diphosgene, an acid chloride. No. 2,397,669. Morris Kharasch to Eli Lilly & Co.

Thiol derivatives, compounds of general formula: $HSCH_2$-$CHSH$-CH_2-O-R where R is saturated aliphatic ether-forming radical. No. 2,397,689. Albert Pavlic and William Peppel to the Secretary of War of the United States of America.

Amination of olefins wherein olefin and ammonia are reacted in presence of finely divided catalyst. No. 2,397,705. John Teter to Sinclair Refining Co.

Preparing new synthetic compositions from liquid organo-siloxanes whose organic substituents comprise monovalent hydrocarbon radicals attached to silicon through carbon-silicon linkages. No. 2,397,727. William Daudt to Corning Glass Works.

Forming cupric soap of a higher fatty acid, which comprises mixing fatty acid with comminuted copper and blowing excess of oxygen-containing gas through mixture. No. 2,397,767. James Taylor to The Procter & Gamble Co.

Amino-ethers and process for their manufacture. No. 2,397,799. Henry Martin, Franz Hafliger, Karl Gatzi, and Adolf Grob to J. R. Geigy A. G.

Production of methylol urea ethers. No. 2,397,825. Herbert West to American Cyanamid Co.

Production of dialkyl ethers which comprises preparing mixture of dimethylol area with aliphatic alcohol from methyl and ethyl alcohols and acid capable of forming insoluble metal salt, etc. No. 2,397,826. Herbert West to American Cyanamid Co.

Recovery of toluene from toluene fraction containing same and like-boiling, non-aromatic hydrocarbons which comprises distilling toluene fraction and rectifying distilled vapors in presence of p-dioxane. No. 2,397,839. Charles Clark to Allied Chemical & Dye Corp.

Refining fatty oil containing oil-soluble proteins to obtain refined oil free of said proteins, comprising subjecting oil to hydrolyzing proteolytic enzyme in presence of water to produce gelatinous water-insoluble flocculation which is insoluble in said oil. No. 2,397,874. Katherine Lloyd and Harvard Keil to Armour & Co.

Manufacture of monomeric acrylic acid which comprises passing molecular oxygen into anhydrous solution of acrolein in organic water-miscible solvent, said solution containing dissolved vanadic acid. No. 2,397,891. Karl Tuerck to The Distillers Co. Ltd.

Preparing new synthetic compositions from condensed methyl siloxane having about 2.5 methyl radicals per silicon atom, comprising intercondensing methyl siloxane with trimethylethoxysilane in presence of water. No. 2,397,895. Earl Warrick to Corning Glass Works.

Methylene-bis-2-hydroxy-3-naphthoic acid salt of compound of class consisting of thiamine and pyridoxine. No. 2,397,903. Bruno Puetzer to Vick Chemical Co.

Preparing acetylpropyl chloride which comprises reacting acetylbutyrolactone with aqueous hydrochloric acid, withdrawing and condensing vapor. No. 2,397,134. Sylvan Forman to U. S. Industrial Chemicals, Inc.

Manufacture of soap by continuous saponification of fat, graining of resulting soap and separation of grained soap from aqueous reagent solution by subsidence. No. 2,397,161. Leopold Sender and Leo Jones to The Sharples Corp.

Manufacture of soap by continuous saponification of fat, graining of resulting soap and separation of grained soap from aqueous reagent solution by subsidence. No. 2,397,162. Leopold Sender and Leo Jones to The Sharples Corp.

Compositions of d, 1-imidazolidone compounds. No. 2,397,250. Robert Duschinsky to Hoffman-La Roche, Inc.

New composition, triethoxy silicol methacrylate. No. 2,397,287. Bertil Ostberg to Polaroid Corp.

Manufacture of gamma-bromo-gamma-acetopropyl acetate which comprises reacting gam a-acetopropyl acetate with dibromide of nitrogen containing heterocyclic base. No. 2,397,333. Franz Bergel and Aaron Cohen to Roche Products Ltd.

Preparing syanoester which comprises reacting hydrogen cyanide in presence of alkaline catalyst with carboxylic acid ester of alpha, beta-unsaturated alcohol. No. 2,397,341. Ellsworth Knowlton to E. I. du Pont de Nemours & Co.

Thiozonides of the 2 cyclo-alken-1 one series. No. 2,397,355. Oskar Huppert.

Preparation of 1-chloro-2-nitroalkanes, which comprises adding mixture of pyridine base, inert solvent and nitro alcohol to chlorinating agent from thionyl chloride and sulfuryl chloride; and inert solvent. No. 2,397,358. Shirley Lingo to Commercial Solvents Corp.

Preparing 1, 1-dichloro-1-nitroalkanes containing more than one carbon atom. No. 2,397,384. John Tindall to Commercial Solvents Corp.

Manufacture of phenanthridine derivatives which comprises cyclization, by means of pentavalent phosphorus halide of 2-acylamidodiphenyl having carbamic ester radical as substituent on another ring carbon atom and having 2'-position free. No. 2,397,391. Leslie Walls to The Imperial Trust for the Encouragement of Scientific and Industrial Research.

Preparing guanamines which comprises heating acyl dicyandiamide with cyanamide in presence of water. No. 2,397,396. Pierrepont Adams to American Cyanamid Co.

Preparing phenylacetaldehyde which comprises passing styrene halohydrin and steam through reaction chamber at 250° C. to 600° C. No. 2,397,412. William Emerson to Monsanto Chemical Co.

Compounds of 2-thio-4, 6-diamino-1, 3, 5-thiadiazine, its tautomers, and acid salts of such compounds. No. 2,397,421. Donald Kaiser and Russell Sperry to American Cyanamid Co.

Preparing dibutyl esters of alkane phosphonic acids which comprises mixing together alkyl halide and sodium dibutyl phosphite. No. 2,397,422. Gennady Kosolapoff to Monsanto Chemical Co.

Preparing N-methyl-p-aminophenol comprising condensing p-bromophenol with methylamine, in presence of copper catalyst. No. 2,397,911. Frederic Bean to Eastman Kodak Co.

Improvement in extracting butadiene from mixture of saturated and unsaturated hydrocarbons with ammoniacal cuprous acetate solution. No. 2,397,996. Samuel Wilson to Standard Oil Development Co.

Acidyl 4-thiobiurets and process of making them. No. 2,398,003. Arthur Hill and William Degnan to American Cyanamid Co.

Manufacturing toluene. No. 2,398,074. David Brandt to Cities Service Oil Co.

Producing diene hydrocarbons which comprises pyrolyzing acylated 1-alken-4-ol at 500° and 600° C. to remove molecule of carboxylic acid therefrom and separating hydrocarbon. No. 2,398,103. John Long to Wingfoot Corp.

Producing ethylene glycol and ethyl acetate, comprising reacting basic lead acetate in presence of ethyl alcohol with ethylene dichloride. No. 2,398,157. Aexander Ramage to Albert Maxwell, as trustee.

Manufacture of ethyl chloride which comprises reacting anhydrous gaseous hydrogen chloride with anhydrous preformed sulphuric ester of ethyl alcohol in presence of free sulphuric acid of catalyst of compounds of antimony, tin and bismuth. No. 2,398,179. Eugen Galitzenstein and Cyril Woolf to The Distillers Co. Ltd.

Fluoro-chloro-butanes. No. 2,398,181. Frank Johnson to E. I. du Pont de Nemours & Co.

Hydraulic fluid consisting of organo-siloxane. No. 2,398,187. Rob Mc Gregor and Earl Warrick to Corning Glass Works.

Preparing sulphide of alkylated monohydroxy aromatic compound. No. 2,398,253. Dilworth Rogers and Herman Heldhusen, Jr., to Standard Oil Development Co.

Bisureas. No. 2,398,283. William Boon to Imperial Chemical Industries Ltd.

Proteinaceous-quaternary ammonium surface active agents and process of making same. No. 2,398,217. Charles MacKenzie and Leonard Spialter to Montclair Research Corp.

Preparation of ethyl chloride by reaction of ethanol and hydrogen chloride with zinc chloride as catalyst. No. 2,396,639. Richard Carter to Hercules Powder Co.

Separating fatty and resin acid constituents of tall oil. No. 2,396,646. Russell Dressler, Robert Vivian and Torsten Hasselstrom.

Separating resin acid and fatty acid fractions from tall oil containing abietic acid. No. 2,396,651. Torsten Hasselstrom.

Metallizable triazine azo compounds. No. 2,396,659. Otto Kaiser to Society of Chemical Industry in Basle.

Modifying fatty oil to improve drying characteristics which comprises incorporating in oil fluorescein and heating mixture. No. 2,396,670. Laszlo Auer.

Recovery of antioxidants from fatty materials with which they are associated, which comprises contacting material with solvent selected from isopropyl alcohol, n-propyl alcohol, acetone, diacetone alcohol, ethyl acetate, methyl acetate, and methyl ethyl ketone, etc. No. 2,396,680. Loran Buxton to National Oil Products Co.

Obtaining antioxidants from fatty materials with which they are associated, which comprises contacting crude fatty material containing natural antioxidants with solvent from methanol and ethanol. No. 2,396,681. Loran Buxton to National Oil Products Co.

Production of monoalkylaromatic hydrocarbons. No. 2,396,682. Don Carmody to Standard Oil Co.

Production of isopropylbenzene. No. 2,396,683. Don Carmody and Harold Huber to Standard Oil Co.

Polymerizing compound having formula $Si(OR')_4$ in which R' is radical from allyl, isobutenyl, crotonyl, and furyl radicals. No. 2,396,692. Philip Garner to Imperial Chemical Industries Ltd.

Preparing product containing tri-isobutylene which comprises contacting C_4 petroleum refinery cut, containing proportion of isobutylene, with aqueous sulfuric acid solution, in presence of added diisobutylene, and separating polymer formed. No. 2,396,753. Raphael Rosen and Ober Slotterbeck to Standard Oil Development Co.

Bis (polyhalovinyl) sulfide. No. 2,396,788. William Hoffman to E. I. du Pont de Nemours & Co.

Ester of formula described in patent. No. 2,396,789. Madison Hunt to E. I. du Pont de Nemours & Co.

Production of butadiene. No. 2,396,854. Jean Jones to Phillips Petroleum Co.

beta-Acetylmercaptoethanesulphonyl chloride. No. 2,396,879. Henry Porter and Arnold Weissberger to Eastman Kodak Co.

Preparation of thiazoles. No. 2,396,893. John Simons to Libbey-Owens-Ford Glass Co.

Bringing monomeric dithioglycidol in contact with polymeric material until at least portion of dithioglycidol sulfur has become bound to polymeric material and removing unbound dithioglycidol. No. 2,396,957. Wilbur Lazier and Frank Signaigo to E. I. du Pont de Nemours & Co.

Converting polyalkyl aromatic hydrocarbon to alkyl aromatic hydrocarbon having fewer number of alkyl groups per molecule. No. 2,396,965. Herbert Passino to The M. W. Kellogg Co.

Converting polyalkyl aromatic hydrocarbon to alkyl aromatic hydrocarbon having fewer number of alkyl groups per molecule, which comprises treating polyalkyl aromatic hydrocarbon in admixture with aromatic hydrocarbon having two alkyl groups per molecule fewer than polyalkyl aromatic hydrocarbon and in presence of hydro-fluoric acid as effective catalyst. No. 2,396,966. Herbert Passino to The M. W. Kellogg Co.

Production of alpha mono halogenated keto acids which comprises reacting soap of unsaturated higher fatty acid containing fatty chain of at least 8 carbon atoms with member of hypobromous and hypochlorous acids to procure halo hydrin fatty acid and oxidizing halo hydrin fatty acid with aqueous chromic acid solution to alpha mono halogenated keto acid. No. 2,396,696. Donald Price and Francis Sprules to National Oil Products Co.

Preparing 1-bromo-2-methylanthraquinone which comprises reacting 2-methylanthraquinone in mixture of oleum and chlorosulfonic acid with bromine, in presence of bromination catalyst and oxidizing agent of chlorine and sulfuryl chloride. No. 2,396,989. Joseph Deinet and Hans Gottlieb to E. I. du Pont de Nemours & Co.

Dehydrating lactic acid in presence of strong mineral acid catalyst in absence of alcohols. No. 2,396,994. Edward Filachione and Charles Fisher to the Secretary of Agriculture of the United States of America.

Esters of 12-hydroxystearic acid. No. 2,397,008. Melvin Hunter and Howard Fenn to The Dow Chemical Co.

Recovering 2:3 butylene glycol from liquid concentrate of carbohydrate fermentation which comprises treating concentrate with alkaline earth compound of oxides and hydroxides to form flowable mass of cream-like consistency containing undissolved excess of alkaline earth metal hydroxide mixing resulting mass with alcohol of saturated aliphatic monohydric series miscible with water in all proportions, to precipitate whole of precipitable impurities. No. 2,397,065. Robert Walmesley and Walter Davis to Imperial Chemical Industries Ltd.

Paints, Pigments

Palette of artist's coloring materials comprising distinctively colored materials, each containing different fluorescent ingredient, mutually separable spectrally. No. 22,741. Alexander Murray and John Yule to Eastman Kodak Co.

Producing pigment containing rutile from hydrated titanium oxide by calcination at 900° C. -1000° C. No. 2,397,430. David Pall to American Cyanamid Co.

Petroleum

Cracking hydrocarbon oils which comprises vaporizing oils, conducting vapors to zone containing dense suspension of powdered inert material, etc. No. 2,397,485. Charles Hemminger to Standard Oil Development Co.

Catalytic cracking and catalyst reactivation which comprises passing oil to be cracked in contact with catalyst comprising bentonite clay activated by treatment with acid. No. 2,397,505. Roger Richardson to Standard Oil Development Co.

Cracking hydrocarbon oils to lower boiling liquid hydrocarbons comprising subjecting oil to cracking temperatures in presence of hydrogen bromide and oxygen. No. 2,397,638. Richmond Bell, Hillis Folkins and Carlisle Thacker to The Pure Oil Co.

Isomerizing olefin hydrocarbons which comprises passing hydrocarbons over catalyst comprising alumina im-regnated with anhydrous hydrogen chloride. No. 2,397,639. Lloyd Berg and George Sumner, Jr., and Charles Montgomery to Gulf Research & Development Co.

Manufacture of aromatic hydrocarbons from charging stocks of aliphatic and hydroaromatic mineral oils, which comprises passing stock in contact with mixture of copper and iron. No. 2,397,715. Charles Weizmann.

Diesel fuel containing high molecular weight organic acidic material obtained from petroleum fractions by caustic treatment and recovered as heavy normally solid to semi-solid bottoms fraction by distilling. No. 2,397,771. Benjamin Anderson and Marcellus Flaxman to Union Oil Co. of California.

Subjecting normal butane to isomerization in presence of metal halide catalyst of Friedel-Crafts type, etc. No. 2,397,820. Ralph Thompson and Joseph Chenicek to Universal Oil Products Co.

Separation of mixture comprising lubricating oil, low melting wax and high melting wax, wherein separation is effected in two stages in which high melting wax is separated in first stage by dewaxing solvent containing methyl ethyl ketone and benzene, and low melting wax is separated in second stage by dewaxing solvent containing methyl ethyl ketone and benzene, step which comprises fractionally distilling solvent which is poor in methyl ethyl ketone, in presence of water. No. 2,397,868. Vance Jenkins to Union Oil Co. of California.

Removal of sulfur compounds from oils. No. 2,397,077. James Alspaugh to Standard Oil Development Co.

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Production of alkylate motor fuel hydrocarbons from isoparaffins and charge stock containing terminal bond olefins. No. 2,397,085. Edward Boedeker and Alex Oblad to Socony-Vacuum Oil Co. Inc.

Producing spreading agent capable of spreading hydrocarbon oil on surface not normally wetted by said oil, comprising treating cracked gasoline distillate with conc. H_2SO_4 to produce acid sludge, extracting acid distillate with water to produce a blue solution, etc. No. 2,397,191. Percy Meyer to Shell Development Co.

Hydrocarbon conversion process which comprises subjecting hydrocarbon to contact with catalyst comprising two components and prepared by forming gelatinous hydrogel of one of components, freezing and then thawing hydrogel to destroy gelatinous structure, and thereafter compositing other components with first-mentioned component. No. 2,397,218. John Sturgeon to Universal Oil Products Co.

Treatment with alkali metal hydroxide of combined product from isomerization and alkylation stages in which isomerization stage is catalyzed with metal halide and the alkylation stage is catalyzed with mineral acid. No. 2,397,224. David Walsh, Jr., and Elza Camp to Standard Oil Development Co.

Conversion of propylene to liquid hydrocarbons which comprises subjecting propylene to between 775° and 800° F. and to high pressures in presence of steam and catalyst comprising chromium oxide and alumina. No. 2,397,301. Hans Vesterdal to Standard Oil Development Co.

Selective catalytic cracking. No. 2,397,329. Robert Ruthruff.

Dehydrogenating hydrocarbons which comprises discharging hydrocarbons, together with powdered catalyst, into bottom of reaction zone whose lower portion is of more restricted cross-sectional area than its upper portion, causing hydrocarbons and catalyst to flow concurrently upward in reaction zone, etc. No. 2,397,352. Charles Hemminger to Standard Oil Development Co.

Converting paraffin hydrocarbon having four carbon atoms, to other forms of paraffinic hydrocarbons which includes, treating with aluminum halide under isomerization conditions in presence of nitroparaffin as promoter. No. 2,397,925. Paul Cramer and Charles Begeman to General Motors Corp.

Making synthetic lubricating oil of high thermal stability by polymerizing propylene contained in liquid propylene-containing hydrocarbon stream. No. 2,397,945. Donald Burney and Edmond d'Ouville and Carl Hull to Standard Oil Co.

Production of paraffin waxes of improved heat and light stability which comprises segregating from wax-containing petroleum oils a wax fraction containing not more than 50% of oil, distilling same over excess sodium hydroxide solution, and recovering overhead of improved heat and light stability. No. 2,397,969. Robert Macke and Herman Zoeller to Standard Oil Development Co.

Cyclic process for separating aromatic hydrocarbons from liquid mixture of hydrocarbons boiling within range of gasoline and kerosene which comprises treating mixture with adsorbent conforming to silica gel in adsorptive properties to adsorb aromatic hydrocarbons from said mixture and washing used adsorbent with non-aromatic liquid desorbing agent and thereby reactivate adsorbent for re-use. No. 2,398,101. Moses Lipkin to Sun Oil Co.

In transfer into well bore of water tending to increase in pH value and containing iron and aluminum compounds which precipitate upon oxidation and clog walls of bore, method of preventing clogging of bore which comprises maintaining water under blanket of gas containing exhaust gas from internal combustion engines such that pH of water is maintained below 4. No. 2,398,123. Wesley Sowers to The Pure Oil Co.

Dehydrogenating dehydrogenatable hydrocarbons containing two or more carbon atoms to hydrocarbons of same number of carbon atoms without splitting of hydrocarbons into hyrocarbons having lesser number of carbon atoms comprising contacting hydrocarbons containing mercury vapor with dehydrogenating catalyst composed of solid porous catalyst carrier and substance from metals and oxides. No. 2,398,126. Carlisle Thacker and Richmond Bell to The Pure Oil Co.

Treatment of sulphide catalysts. No. 2,398,175. Robert Cole to Shell Development Co.

Regenerating solid catalytic material contaminated with combustible carbonaceous material in which oxygen containing regenerating gases admixed with steam diluent is contacted with catalytic material. No. 2,398,186. John Loy to Phillips Petroleum Co.

Motor fuel consisting of gasoline in which is dissolved mononuclear aromatic amine having less than 7 carbon atoms in attached alkyl radicals and asymmetric ketone selected from five and six carbon atom di-alkyl ketones. No. 2,398,197. Albert Stanly to Shell Development Co.

Apparatus for treating oil and water emulsion containing gas, comprising vessel provided with upstanding partitions arranged to form inlet compartment, including water knock-out zone, having bottom drawoff for water and upper outlet for residual emulsion containing gas, etc. No. 2,398,204. Rudolph Buchan to Standard Oil Development Co.

Starting up of fluid flow catalytic cracking operation of down-flow type in which catalyst is continuously withdrawn from bottom of reactor and fed to regenerator from which it is fed back to reactor, steps of setting catalyst into motion through its cycle with hot gas, etc. No. 2,398,228. Ernest Hunt to Standard Oil Development Co.

Making sulfurized lubricating oil additive which consists in heating polymer obtained by vapor clay treatment of steam cracked petroleum distillates with sulfurizing agent. No. 2,398,271. John Zimmer and Arnold Morway to Standard Oil Development Co.

Cracking of hydrocarbon oils. No. 2,398,280. Joseph Barron to The Texas Co.

Antiknock agent having lead antiknock compound, and chlorine compounds capable of reacting with lead compound during combustion in engine. No. 2,398,281. Earl Bartholomew to Ethyl Corp.

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Antiknock mixture of iron pentacarbonyl and tetra-alkyl lead. No. 2,398,282. Earl Bartholomew to Ethyl Corp.

Filter for hydrocarbon oils comprising oil-permeable mass of fibrous material, fibers of which have large surface area and are coated with metallic salt of unsaturated fatty acid. No. 2,398,284. Southwick Briggs.

Passing vapor mixture containing conjugated diolefin as principal hydrocarbon ingredient having degree of unsaturation as great as that of diolefin and also containing alpha-beta-unsaturated aliphatic hydrocarbon having no hydrogen atoms attached to beta-carbon atom into contact with finely divided substance selected from copper and iron and oxides of said metals. No. 2,398,301. Ludo Frevel to The Dow Chemical Co.

Combination heater and water knockout apparatus for treating oil well streams. No. 2,398,338. Jay Walker, forty per cent to Guy Merchant and six per cent to C. G. Wells.

Cracking higher boiling hydrocarbons to form lower boiling hydrocarbons for motor fuel which comprises passing oil in vapor state through cracking zone containing catalyst consisting of alumina and tungsten oxide. No. 2,396,641. Gerald Connolly to Standard Oil Development Co.

Manufacturing light aromatic hydrocarbons and normally gaseous unsaturated hydrocarbons from normally gaseous paraffinic hydrocarbons which comprises admixing with paraffin a fluid, easily reducible heavy metal halide. No. 2,396,697. Everett Gorin to Socony-Vacuum Oil Co. Inc.

Conversion of fluid reactants. No. 2,396,709. Friedrich Leffer, naturalized as Frederick Leffer to Universal Oil Products Co.

Catalytically isomerizing normal butane by metallic halide isomerization catalyst in presence of hydrogen chloride promoter. No. 2,396,723. Loren Scoville and James Davies to The Texas Co.

Producing gasoline by cracking hydrocarbon oil which comprises admixing oil with undried hydrous silica prepared from metal silicate solution and containing imbibed water and having mixed therewith actve oxide cracking catalyst, etc. No. 2,396,758. Reginald Stratford to Standard Oil Development Co.

For obtaining high yields of pure toluene from naphthenic base petroleum. No. 2,396,761. Joshua Tilton to Standard Oil Development Co.

Purifying hydrocarbon fraction containing alkyl fluoride which comprises subjecting fraction to dehydrofluorinating catalyst to decompose alkyl fluoride into hydrogen fluoride and olefin, and contacting resultant mixture with alkali metal fluoride to separate hydrogen fluoride from hydrocarbons. No. 2,396,844. Aristid Grosse and Carl Linn to Universal Oil Products Co.

Production of high octane number paraffinic motor fuel stock solely from lower-boiling alkylatable straight-chain paraffin hydrocarbons and lower-boiling olefin hydrocarbons. No. 2,396,853. Jean Jones to Phillips Petroleum Co.

Contacting reaction effluent from hydrocarbon conversion catalyzed by metal halide of Friedel-Crafts type in presence of hydrogen halide with liquid phosphoric acid and thereby effecting removal of catalyst therefrom without removing hydrogen halide. No. 2,396,859. John Latchum, Jr. to Phillips Petroleum Co.

Converting normally gaseous paraffinic hydrocarbons into oxygenated organic compounds which comprises contacting hydrocarbons in presence of oxygen with aqueous solution of plant food inoculated with hydrocarbon-consuming bacteria of Bacillus methanicus and Bacillus ethanicus. No. 2,396,900. Millard Taggart, Jr. to Standard Oil Development Co.

Dry composition free of soft asphalt comprising mixture of dry pulverized coal tar pitch and dry pulverized natural asphalt to be mixed with cold petroleum oil in which asphalt is solvent when cold to make termite-proof final product. No. 2,396,910. William Zaisser, one-half to Harry Walker.

Photographic

Developing silver halide latent image with developer comprising crystalline ternary addition compound of each of three compounds, a poly-hydroxybenzene, a member of ortho-amino-phenols and para-amino-phenols, and compound of formula described in patent. No. 2,397,676. Robert Lyon to E. I du Pont de Nemours & Co.

Photographic element comprising support bearing layer composed of hydrophilic, colorless, synthetic polymer color-former containing plurality of aliphatic alcohol hydroxyl groups as predominant hydrophilic groups and having color-former nuclei containing structure of formula described in patent. No. 2,397,864. Andrew Jennings, Otis Murray and Clayton White to E. I. du Pont de Nemours & Co.

Color-yielding element comprising support bearing light-sensitive silver halides in layer consisting of hydrophilic dye intermediate ether of polyvinyl alcohol. No. 2,397,865. Andrew Jennings to E. I. du Pont de Nemours & Co.

Element for recording photographic images which comprises a support having imposed thereon water-permeable layer composed of hydrolyzed interpolymer of aliphatic, terminally unsaturated mono-olefin of 2 to 4 carbon atoms and vinyl ester. No. 2,397,866. David McQueen to E. I. du Pont de Nemours & Co.

Color yielding element comprising support bearing layer composed of hydrophilic vegetable protein color former, having plurality of color former groups, each linked by carbon to carbon linkage to a $-CH_2-$ group to amino nitrogen atom of protein molecule, each color former group containing in one of its tautomeric forms a composition of structure described in patent. No. 2,397,867. Andrew Jennings to E. I. du Pont de Nemours & Co.

Producing color separation positives for photo-mechanical color printing process which comprises creating original with coloring materials containing three fluorescent ingredients of different fluorescent hues. No. 22,736. Alexander Murray and John Yule to Eastman Kodak Co.

Color-yielding unit which consists of layer comprising reducible silver salt and coacting color former layer composed of colloid film-forming material capable of forming azo dye upon coupling and dye taken from indophenol, indoaniline, and azomethine dyes. No. 2,397,452. Clayton White to E. I du Pont de Nemours & Co.

Fixing photographic element, which comprises immersing element in bath which contains lower aliphatic alcohol and member of thiourea and water soluble thiocyanates. No. 2,397,924. John Crabtree and George Eaton to Eastman Kodak Co.

Photographic dry stripping film consisting of paper temporary support, stripping layer of hydrolyzed cellulose acetate having acetyl content of 16-18%, sensitive emulsion layer, white pigmented layer and thermoplastic layer. No. 2,398,056. Cyril Staud to Eastman Kodak Co.

Producing three color positive prints which comprises printing in register from color separation negatives two color value images on transparent support carrying silver halide emulsion layer on each side, etc. No. 2,396,726. Lyne Trimble.

Fixing photographic element which includes non-gelatin layer containing developed silver image which comprises immersing element in bath which contains ethylenediamine and member of group of trimethyl amino methane; 2,4,6-triamino toluene trihydrochloride; 6 methyl-2-amino benzothiazolium p-toluene sulfonate; and thiourea. No. 2,396,830. John Crabtree and George Eaton to Eastman Kodak Co.

Silver halide photographic emulsions. No. 2,397,015. John Kendall and Douglas Fry to Ilford Ltd.

Combined developing and fixing solution for silver halide photographic emulsions including developing agent, alkaline salt, preservative, and alkali metal iodide and sodium thiosulfate, said solution having pH between 8.0 and 9.5. No. 2,397,016. Robert King to The Photo Technical Corp.

Polymers

Manufacturing thermoplastic article containing metallic insert partly enclosed in said article. No. 2,397,471. Henry Cox to Carbide & Carbon Chemicals Corp.

Resinous condensation product prepared by partially deesterifying, in presence of acid deesterification catalyst and carbonyl compound selected from aldehydes, cyclohexanone and methylcyclohexanone, etc. No. 2,397,548. William Kenyon and William Fowler, Jr. to Eastman Kodak Co.

Electrical resistor comprising tubular metal base having high resistance to shock and fatigue, and exterior moisture proof sheath comprising polymerized tetrafluoroethylene. No. 2,397,568. Ellsworth Seaman.

Composition for insulating and protective covering for conductors, comprising copolymer of vinyl chloride and vinyl acetate as a base, and plasticizer therefor comprising hydrogenated methyl abietate, and mixture containing acetylated castor oil, butoxy ethyl stearate, and butyl acetyl ricinoleate. No. 2,397,592. Ansley Blades to General Cable Corp.

Preparing resinous material which comprises heating mixture of dicyclopentadiene and unsaturated glyceride oil. No. 2,397,600. Howard Gerhart to Pittsburgh Plate Glass Co.

Preparing resinous product which comprises, in absence of catalysts, heating in closed system a mixture of (A) polymers of cyclopentadiene and (B) unsaturated glyceride oil until copolymer soluble in petroleum naphtha is obtained. No. 2,397,601. Howard Gerhart and Leon Adams to Pittsburgh Plate Glass Co.

Preparation of ester polymers which comprises heating under alcoholysis conditions and in presence of non-acid alcoholysis catalyst an organic carboxylic acid ester and compound selected from di-(beta-hydroxyethyl formal, di(beta-(hydroxyethoxy) methoxy) ethane, etc. No. 2,397,602. William Gresham to E. I. du Pont de Nemours & Co.

Plastic interlayer for interposition between pair of sheets of glass to form safety glass, said interlayer comprising flexible sheet of polyvinyl acetal resin plasticized with ester of (A) dihydroxy ethyl ether alcohol and (B) mixture of branched chain acids obtained by air oxidation of open-chain petroleum hydrocarbon. No. 2,397,612. William Lycan to Pittsburgh Plate Glass Co.

Preparing resinous materials which comprises copolymerizing monomeric mixture of vinyl chloride and trichlorethylene. No. 2,397,724. Oliver Cass to E. I. du Pont de Nemours & Co.

Coating on base, said coating comprising butyl methacrylate polymer containing 75% butyl methacrylate and having molecular weight of 5,000 and containing dispersed finely divided metallic silver, and metal object soldered to coating. No. 2,397,744. Francois Kertesz to E. I. du Pont de Nemours & Co.

Transparent, unitary sheet, central portion comprising polyvinyl alcohol derivative chemically transformable to polyvinyl alcohol, integrally formed layer on each surface of sheet comprising molecularly oriented polyvinyl alcohol, each said layer and said central portion merging together, merger comprising copolymer molecules of derivative and polyvinyl alcohol. No. 2,397,149. Edwin Land to Polaroid Corp.

Liquid thermo-setting resin adhesive composition comprising resinous condensation product obtained by heat-reacting mixture of ingredients consisting of 37% aqueous formaldehyde, urea, and 28% aqueous ammonia in open vessel at from 95 to 100° C. for 25 to 35 minutes. No. 2,397,194. Gustavus Harry Miller.

Acceleration of polymerization of butadiene-1,3 hydrocarbons, which comprises preparing aqueous solution containing water-soluble persulfate and water-soluble ferricyanide, aging solution at 30 to 60° C. to increase ability of solution to accelerate polymerization. No. 2,397,201. Emert Pfau to The B. F. Goodrich Co.

Resinous reaction product resulting from heating acyclic terpene hydrocarbon having three double bonds per molecule with aldehyde from formaldehyde and trioxymethylene in presence of catalytic material selected from inorganic acid, unsubstituted organic carboxylic acid, and organic sulfonic acid. No. 2,397,205. Alfred Rummelsburg to Hercules Powder Co.

Manufacturing coated light polarizers comprising coating sheet of light-polarizing, plastic material with thin layer of light-transmitting, adhesive material, then applying to sheet coating of polymerizing coating. No. 2,397,231. Carl Barnes to Polaroid Corp.

Ester resin comprising reaction product of cyclopentadiene adduct of maleic anhydride with polyhydric alcohol and reactant from fatty acids of drying and semi-drying oils, their monoglycerides and their oxidized triglycerides. No. 2,397,240. William Butler to Bakelite Corp.

Light-polarizing device comprising light-transmitting supporting element, means providing on support a light-polarizing surface comprising extremely thin film of molecularly oriented plastic material, means for protecting surface from impact, comprising layer of resilient, impact-resistant, light-transmitting, plastic material, said layer comprising resin from urea-formaldehyde and melamine-formaldehyde and non-oxidizing and non-setting alkyd resin, and for protecting last-named layer from abrasion, layer of hard, abrasion-resistant, light-transmitting plastic material adhering to impact-resistant layer. No. 2,397,242. Lewis Chubb, Jr. and Clinton Young to Polaroid Corp.

Producing polymers of ethylene and vinylidene chloride which comprises heating ethylene and vinylidene chloride in presence of per-oxy compound catalyst. No. 2,397,260. William Hanford and John Roland to E. I. du Pont de Nemours & Co.

Transparent plastic material having uniformly oriented, long chain molecules, predetermined portions of material being dyed with dye which renders portions negatively dichroic and predetermined portions being dyed with dye which renders said portions positively dichroic, said negatively dichroic portions and positively dichroic portions forming in

polarized light two separate images. No. 2,397,276. Edwin Land to Polaroid Corp.

Welted shoe, comprising welt and outsole bonded to each other and each composed of fibrous felt impregnated with thermoplastic. No. 2,397,316. John Horvit to Spencer Shoe Corp.

Plastic nonflammable composition, free from volatile solvents, comprising ethyl cellulose, compatible plasticizer therefor, and water-insoluble heavy metal oxalate. No. 2,397,320. William Koch to Hercules Powder Co.

Making a synthetic resin which comprises digesting natural furfural-yielding material with steam in presence of acid, liberating furfural and other volatile substances, and reacting furfural and other vapors with phenol vapor in alkaline environment. No. 2,397,323. Julius Trefz and Leonard Shoberg to Julius Trefz.

Making hollow articles which comprises preparing reaction bath comprising acetalization catalyst and isopropyl-formal, subjecting sheet of polyvinyl alcohol to action of bath to cause sheet to be rendered water-insoluble progressively from its outer surface inward, stopping reaction while intermediate water-soluble portion remains and dissolving water soluble inner portion of said sheet. No. 2,397,340. Joseph Dahle to Pro-phy-lac-tic Brush Co.

Production of resinous product by condensation, in presence of acid condensing agent, of formaldehyde and petroleum fraction rich in aromatic hydrocarbons, improvement affording high melting point product of light color. No. 2,397,398. Darwin Badertscher and Richard Bishop to Socony-Vacuum Oil Co. Inc.

Synthetic lumber comprising dense and incompressible, rigid body of heat-molded composition comprising continuous uninterrupted mass of heat-set resin and fibrous material interspersed therethrough. No. 2,397,936. Alfred Glidden and Walter Hickler to The B. F. Goodrich Co.

Pastes comprising polyvinyl halide consisting of polymerized vinyl halide, aromatic tri-ester of phosphoric acid, glycol ether phthalate and hard thermoplastic polymer other than polyvinyl halide which is soluble in the mixture. No. 2,397,942. Ernest Brookman and Laurence Smith to Imperial Chemical Industries Ltd.

Production of heat-insulation material from cellulose acetate of cellular structure, which comprises saponifying discrete particles of cellulose acetate to obtain regenerated cellulose, mixing cellulose with solution of adhesive binder in volatile solvent and subjecting resulting mixture to shaping operation. No. 2,398,001. Clifford Haney and Mervin Martin to Celanese Corp. of America.

Emulsion polymerizing monomeric material butadienes-1,3 and mixtures thereof with other vinyl compounds in aqueous emulsions, step of conducting polymerization in presence of sulfuretted commercial paraffin hydrocarbons, which are mixtures of 14 to 32 carbon atom paraffins and contain sulfur attached at random to carbon atoms in form of divalent sulfur groups. No. 2,398,105. Gerry Mack to Advance Solvents & Chemical Corp.

Protein-acetone resin composition comprising nitrogenous body from water-soluble proteins and alkali proteins and, as hardening agent under heat, water-soluble acetone resin consisting of reaction product of 1 mole of acetone with about 6 moles of formaldehydr in presence of borax as condensing agent. No. 2,398,307. Frederick Hessel and John Rust to Ellis-Foster Co.

Producing tall oil of stabilized low viscosity and freedom from crystallization by selective polymerization of band of resin acids content which are polymerized by reaction with sulphuric acid. No. 2,398,312. William Jennings to Camp Manufacturing Co. Inc.

Heat-curable composition comprising water-soluble polyhydric phenol having hydroxyl groups attached to same aryl nucleus, water soluble hard acetone-formaldehyde resin formed by reacting acetone with formaldehyde in presence of borax, and curing catalyst therefor. No. 2,398,331. John Rust and Frederick Hessel to Montclair Research Corp.

Fabrication of polytetrafluoroethylene articles. No. 2,396,629. Johannes Alfthan and John Chynoweth to E. I. du Pont de Nemours & Co.

Making modified and softened rosin product from hard and brittle rosin, which process comprises adding metal rosinate to rosin, and heating mixture out of contact with atmosphere, said metal rosinate being rosinate of metals from alkaline earth metals, magnesium, zinc and aluminum. No. 3,396,671. Laszlo Auer.

Polymerizing ethylene which comprises carrying out polymerization in presence of organic peroxide catalyst and in absence of dispersing agent. No. 2,396,677. Merlin Brubaker to E. I. du Pont de Nemours & Co.

Combining fatty oil with alkyd resin-forming components. No. 2,396,698. Edward Haines to Geo. D. Wetherill Varnish Co. Inc.

Copolymerization product of tetrafluoroethylene, a perchlorofluoroethylene containing two fluorine atoms, and hydrogen-containing halogenated ethylene. No. 2,396,713. Elmore Martin to E. I. du Pont de Nemours & Co.

Synthetic linear polyamide plasticized with compound described in patent. No. 2,396,715. Frank McGrew to E. I. du Pont de Nemours & Co.

Modifying raw castor oil, which comprises reacting raw castor oil with maleic anhydride. No. 2,396,763. Harry Ullmann.

Polymerizing hydrolyzable composition from ethylene and compound from organic polymerizable compounds containing mono-olefinic unsaturation or polyolefinic unsaturation in presence of solvent from saturated aliphatic hydrocarbons and aromatic hydrocarbons, in presence of per compound catalyst. No. 2,396,785. William Hanford to E. I. du Pont de Nemours & Co.

Mixture of linear polymeric materials having nitrogen groups substituted for hydrogen on aromatic carbon of linear polymeric materials. No. 2,396,786. William Hanford to E. I. du Pont de Nemours & Co.

Preparation of normally semi-solid to solid polymers of ethylene. No. 2,396,791. Norman Krase and Allen Lawrence to E. I. du Pont de Nemours & Co.

Preparation of synthetic resins from thiazoles. No. 2,396,894. John Simons to Libbey-Owens-Ford Glass Co.

Polymerizing ethylene, which comprises carrying out polymerization in presence of molecular oxygen, and per-oxy compound catalyst. No. 2,396,920. Alfred Larson to E. I. du Pont de Nemours & Co.

Polymeric ketone having molecular weight of at least 1000, having multiply recurring structural units containing ketone carbonyl group, and having plurality of recurring units containing beta-cyanoethyl group on carbon contiguous to ketone carbonyl. No. 2,396,963. Carl Mortenson to E. I. du Pont de Nemours & Co.

Polymerizing monomeric material selected from class of styrene and esters of acrylic acid in presence of sulphur-containing modifiers of polymerization described in patent. No. 2,396,997. Charles Fryling to The B. F. Goodrich Co.

Non-resinous, thermo-setting, stable liquid product of reaction of phenolic compound from mono-hydroxy benzene and its carbon alkylated products with formaldehyde. No. 2,397,018. John Kroeger and Harry O'Connor to Fred'k H. Levey Co. Inc.

Processes and Methods

Continuously concentrating aqueous dispersion of colloidally dispersed substance, which comprises repeatedly immersing in dispersion and exposing to evaporative conditions a plurality of spaced-apart surfaces, spaces between surfaces increasing progressively as concentration of dispersion increases. No. 2,397,818. Harry Tausch to American Anode Inc.

Carrying on endo-thermic catalytic reaction which comprises establishing incandescent source of radiant heat to supply heat requirements of reaction by radiation, irradiating with heat catalytic surface of spaced layers of catalyst, and passing reactants in gaseous phase over surfaces thus heated. No. 2,397,899. Roman Witkiewicz.

Separating solid materials of different specific gravities according to sink-and-float method. No. 2,398,127. Fredrick Trostler and Thomas Andrews to The Sink & Float Corp.

Reducing thermal decomposition of surge volume of liquid which comprises withdrawing hot liquid from vessel, maintaining reservoir of cooler liquid as surge volume, etc. No. 2,398,213. Keith Dutson, Jr. and Delmas Smith to Standard Oil Development Co.

Bringing into solution organic solids with organic liquid comprising preheating mass containing organic solid material in intimate association with organic liquid, then forcing preheated mass through orifice or stricture wherein terriffically high pressure is dissipated thereby suddenly generating great heat and violent turbulence to effect solution of the solids in the liquid. No. 2,396,752. Fred Roddy.

Detecting changes in content of given chemical constitutent in fluid, comprising continuously subjecting portion of fluid flowing as stream to treatment for removal of constituent, thereafter treating portion to add constituent thereto to establish known concentration of constituent therein, then comparing treated portion of fluid with similar stream of untreated fluid to determine relative concentrations. No. 2,396,934. Charles Wallace to Wallace & Tiernan Products, Inc.

Rubber

Adhesively bonding rubber to other surfaces by means of heat and pressure and intermediately disposed layer which includes rubber derivative obtained by depolymerizing action of heat and oxygen on dissolved raw rubber in presence of free sulfur and vulcanization accelerator, in combination with partially reacted soluble phenol-aldehyde resin from crotonaldehyde resorcinol, furfural-resorcinol, etc., and hardening agent for partially reacted resin. No. 2,397,627. Omar Smith to United States Rubber Co.

Polymerizing butadiene and acrylonitrile, steps of dissolving Friedel-Crafts active halide catalyst, comprising zinc chloride, in water, adding emulsifying agent, adding butadiene and acrylonitrile thereto, and polymerizing. No. 2,397,146. Henry Kellog and William Sparks to Standard Oil Development Co.

Vulcanizable composition comprising vulcanizable, polymeric, conjugated diene elastomer and monomeric ester of a beta furylacrylic acid. No. 2,397,372. Henry Rothrock and William Wood to E. I. du Pont de Nemours & Co.

Vulcanizing polychloroprene synthetic rubber in which major portion of monomeric material employed was chloroprene, which comprises incorporating with unvulcanized chloroprene rubber an addition compound of halide of group consisting of aluminum, antimony, boron, cadmium, chromium, etc., and nitrogenous organic base which does not contain nitrogen-to-nitrogen linkage. No. 2,397,399. William Baird, Bernard Habgood, David Harper and James Hendry to Imperial Chemical Industries Ltd.

Vulcanizing rubber and sulfur-vulcanizable rubber-like materials in presence of sulfur and vulcanization accelerator comprising stable chemical complex obtained by fusing diarylguanidine-zinc chloride adduct with paraformaldehyde and substance from mercaptobenzothiazole, benzothiazole disulfide and mercaptothiaozline. No. 2,397,409. Arnold Davis to American Cyanamid Co.

Coagulating natural latex which comprises adding equimolecular mixfure of chloral hydrate and alkali metal cyanide. No. 2,398,103. Jack Lockridge to Wingfoot Corp.

Vulcanizing zinc-free rubber which comprises impregnating rubber with vulcanizing ingredients by treating with sulphur-containing bath of hydrocarbon-disubstituted dithiocarbamate of metal whose oxide is accelerator activator and hydrocarbon-disubstituted ammonium salt of hydrocarbon-disubstituted dithio-carbamate. No. 2,398,154. Robert Olin and Howard Cramer.

Rubbery polymerization product of butadiene-1,3 and benzal malononitrile. No. 2,398,321. David Mowry to Monsanto Chemical Co.

Butyl rubber package comprising container having inside lining comprising stabilized lecithin-oil composition and butyl rubber in contact with lining. No. 2,396,633. Isidor Bernstein to H. D. Roosen Co., Inc.

Coagulating synthetic rubber latex consisting of aqueous dispersion of copolymer of butadiene and styrene, which comprises freezing synthetic rubber latex, etc. No. 2,396,907. I. Louis Wolk and John Upham to Phillips Petroleum Co.

Vulcanizing rubbery material made by polymerization of butadiene-1, 3 hydrocarbon with ethylene compound, which comprises heating it in presence of sulfur and reaction product of formaldehyde with mercaptoarylthiazole, and in presence of aromatic carboxylic acid. No. 2,396,967. Warren Phillips to The B. F. Goodrich Co.

Synthetic rubber composition comprising rubbery copolymer of butadiene-1, 3 and styrene, and copolymer of butadiene-1, 3 and acrylonitrilee. No. 2,397,050. Donald Sarbach to The B. F. Goodrich Co.

Specialties

Cement composition of hydraulic cement type comprising sal ammoniac, salt petre, sodium chloride, and sulphur. No. 2,397,567. Emmitt Scrafford.

Packing material comprising cleaned fibrous porous core of loofah fruit having its pores filled with mixture of organic binder with graphite. No. 2,397,618. Conor O'Connor.

U. S. Chemical Patents

From Official Gazette—Vol. 584, Nos. 3, 4—Vol. 585, Nos. 1, 2 (March 19-April 9)—p. 696

Transfer film to be initially supported by backing sheet and then applied to exterior surface, said film comprising pigmented layer disposed next to surface, reflective layer containing metallic pigment overlying pigmented layer, screen layer composed of flat pigment printed on reflective layer in screen pattern, and clear protective layer. No. 2,397,623. Thomas Reese to The Di-Noc Co.

Arachnicidal preparation comprising aqueous suspension of N-isopropylidene-p-ethoxy-aniline. No. 2,397,633. William ter Horst to United States Rubber Co.

Manufacture of glue by dechroming comminuted leather waste. No. 2,397,650. Frank De Beukelaer to Industrial Patents Corp.

Preparing lubricating oils. No. 2,397,662. Lawrence Henderson and Weldon Annable to The Pure Oil Co.

Producing novel surface active compounds which comprises reacting sulfonated compound from sulfonated rosin; sulfonated hydrogenated, sulfonated dehydrogenated, sulfonated disproportionated and sulfonated decarboxylated rosin, etc., with compound from aliphatic alcohols and alkenes in presence of strong sulfonating agent. No. 2,397,692. Donald Price and Everette May to National Oil Products Co.

Additive for mineral oils which comprises metal salt of sulfurized derivative of ricinoleic acid reaction product of diarylchloro-phosphite made by esterifying alkylated phenol which contains alkyl group having 3 to 5 carbon atoms with phosphorus trichloride. No. 2,397,702. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Mildewproofing agent comprising non-alkali metal starchate in which starchate anion is bound to salt of said non-alkali metal. No. 2,397,732. Kenneth Gaver to The Ohio State University Research Foundation.

Normally usable and removable pressure-sensitive adhesive masking sheet for service under high temperature conditions and which includes backing and pressure-sensitive adhesive coating firmly united thereto, said adhesive coating comprising vulcanizable rubber, coumarone-indene type tackifying resin and vulcanizing agent. No. 2,397,774. Donald Buckley to Industrial Tape Corp.

Insecticidal compounds and process of making same. No. 2,397,802. Paul Muller to J. R. Geigy A. G.

Base coat composition for launching greases comprising composition of paraffin wax containing amorphous wax, and asphalt. No. 2,397,805. Thomas Ott to Union Oil Co. of California.

Pre-pasted wall paper having printed surface simulating cedar wood and having oil of cedar together with retardant incorporated into paper stock, said wall paper having its printed surface treated by casein plastic coating to decrease permeability of paper stock whereby odor is gradually emitted after application to wall. No. 2,397,817. Le Roy Staunton, John Close and Roy Hess to Trimz Co. Inc.

Liquid fuel consisting of suspension of finely divided bituminous fuel in hydrocarbon oil, stabilized with acid from sulfuric, hydrocarbon sulfonic, and phosphoric acids. No. 2,397,859. Arthur Hersberger and Kenneth Thompson to The Atlantic Refining Co.

Corrosion inhibiting lubricant composition for small arms and like comprising neutral solution, in highly refined petroleum lubricating oil of low pour point, of neutral components of wool grease, lecithin and methyl esters of high molecular weight saturated aliphatic acid: derived from oxidation of lubricating oil, together with oil-soluble calcium soaps of acids normally present in wool grease, lecithin and methyl esters and calcium amyl phenate oxidation-retarding agent. No. 2,397,904. James Shields to Alox Corp.

Composition for molding, comprising expanded vermiculite granules coated with pulverulent heat plasticizable organic binder attached to vermiculite through layer of viscous semi-solid material. No. 2,397,083. Harry Bellamy.

Coating composition to impart moisture impermeability to materials coated therewith, comprising solution of polystyrene, a wax, another thermoplastic resin and as sole plasticizer the distillate obtained by distilling polymerized alpha-methyl-para-methyl styrene. No. 2,397,093. Camille Dreyfus and Bjorn Andersen to Celanese Corp. of America.

Resin bonded abrasive wheel having ratio of diameter to thickness not less than 60 comprising abrasive grains bonded with heat-hardened resin and sheet of fabric impregnated with a heat-hardened resin attached to one side of wheel. No. 2,397,101. George Goepfert and Ralph Rushmer to The Carborundum Co.

Composition comprising mixture of alkyl aryl sulphonates in which alkyl groups are derived from petroleum distillate which mixture develops rancid odor of being stored, and in admixture therewith hydroxy-aromatic compound derived from member of benzene and its homologues and naphthalene and its homologues, as odor inhibitor. **No. 2,397,133.** Lawrence Flett to Allied Chemical & Dye Corp.

Impression material comprising water-soluble alginate, filler and barium bromate. **No. 2,397,143.** Homer van Beuren Joy to Montclair Research Corp.

Impression material comprising water-soluble alginate and setting agent therefor selected from calcium and strontium sulphide. No. 2,397,144. Eugene Molnar.

Impression material comprising water-soluble alginate, filler and alkaline-earth chromate hardening agent selected from calcium and strontium chromates. No. 2,397,145. Homer van Beuren Joy and Eugene Molnar.

Bleaching smooth wood surfaces which comprises applying thin film of bleach solution consisting of alkali component consisting of borax, caustic soda, waterglass, and second component consisting of hydrogen peroxide (30% by weight). No. 2,397,193. Gustavus Harry Miller.

Cleaning obstructions in pipe caused by vegetable matter, which consists in introducing into pipe mixture of caustic soda, copper sulphate and ammonium sulphate. No. 2,397,328. Arnold Ripley.

Transformer oil consisting of light mineral oil and to inhibit oxidation of transformer oil, di-cyclohexyl tartrate. No. 2,397,332. Earl Arnott to Union Oil Co. of California.

Mineral oil composition resistant to foaming, comprising mineral oil and dimethylaniline isoamyl octyl orthophosphate exhibiting pH between 2 and 4. No. 2,397,377. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Mineral oil composition resistant to foaming, comprising mineral oil and quinoline isoamyl octyl phosphate. No. 2,397,378. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Mineral oil composition resistant to foaming, comprising mineral oil and pyridine isoamyl octyl phosphate. No. 2,397,379. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Mineral oil composition resistant to foaming, comprising mineral oil and lutidine isoamyl octyl phosphate. No. 2,397,380. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Mineral oil composition resistant to foaming, comprising mineral oil and nicotine isoamyl octyl phosphate. No. 2,397,381. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Protecting organic material against microorganisms which comprises treating with material selected from 3, 6-di (tertiary amino) thiaxanthenes, 3, 6-di (tertiary amino) thiazanthene salts, etc. **No. 2,397,423.** Elbert Ladd to United States Rubber Co.

Mineral fiber treating and bonding material comprising stable aqueous emulsion of partially polymerized furfuryl alcohol and gelatin as emulsifying agent for furfuyl alcohol. No. 2,397,453. Erven White and Clayton Smucker to Owens-Corning Fiberglas Corp.

Lubricating grease containing grease orming lubricant base and lithium soap of 12-hydroxy stearic acid which increases ability of grease to maintain its consistency when mechanically worked. No. 2,397,956. Harold Fraser to International Lubricant Corp.

Antifouling composition comprising (1) toxic component which is non-resinous condensation product of (a) a bifunctional phenolic body (b) saturated unsubstituted lower aliphatic mono-aldehyde and (c) unsaturated aldehyde from cinnamic aldehyde together with its lower alkyl nuclear-substituted homologs; (2) permeable organic film-forming vehicle. No. 2,398,069. George Young to Stoner-Mudge, Inc.

Manufacture of lime grease, which comprises hydrating lime soap in presence of preferentially water soluble surface active substance capable of reducing interfacial tension between water and hydrophobic phase. No. 2,398,075. Lawrence Brunstrum and Hubert Liehe to Standard Oil Co.

Composition for deanodizing aluminum and aluminum alloys, being dry mix consisting of 80% hemi-sodium phosphate and 20% chromic acid. No. 2,398,079. Joseph Janota, Jr. and Bland Button, Jr. to The Diversey Corp.

Preparing rust inhibitor for steam turbine oils which comprises neutralizing used aqueous alkali solution from treatment of petroleum distillates containing phenolic bodies and contacting with solid adsorbent material the resulting "acid oil" mixed with low-boiling solvent, amount of absorbent and time of contact being sufficient to remove from "acid oil" ingredients which deleteriously affect rust inhibiting properties of "acid oil." No. 2,398,120. Hans Schindler to The Pure Oil Co.

Lithium soap grease comprising lithium soap, hydrocarbon oil and unsulfurized ester of a polyhydric alcohol and an acid. No. 2,398,173. Lawrence Brunstrum and Hubert Liehe to Standard Oil Co.

Rust preventive lubricant comprising lubricating oil, and corrosion inhibiting proportions of anhydroalkitol and a carboxylic acid and aliphatic soap of a preferentially oil-soluble petroleum sulfonic acid. No. 2,398,193. Thomas Sharp to Standard Oil Co.

Corrosion-preventive composition comprising oleaginous vehicle containing corrosion inhibiting amount of dicarboxylic acid having 16 carbon atoms, two acid radicals being linked through element selected from S, Se, and Te. No. 2,398,202. Ernest Zublin, Ellis White and Emmett Barnum to Shell Development Co.

Paint and varnish remover comprising paste-like mixture of water, monoethanolamine, monoethanolamine oleate, kerosene, 1-nitropropane, and isopropyl alcohol. No. 2,398,242. John Morgan and Russell to Cities Service Oil Co.

Absorption base consisting of oleaginous material and condensation product of hydroxy-ethyl non-tertiary amine and oleic acid. No. 2,398,254. Nina Rosenthal to Ninol Development Co.

Imparting water repellent properties to fibrous products, which comprises applying compound of the class described in patent. No. 2,398,272. David Aelony to Monsanto Chemical Co.

Emulsion containing oleaginous material, aqueous material, and (1) aliphatic polyhydroxy substance incompletely esterified with higher molecular weight fatty acid, and (2) cation-active substance in form of a salt of a nitrogenous compound. No. 2,398,295. Albert Epstein and Morris Katzman to The Emulsol Corp.

Emollient composition including water and (1) aliphatic polyhydroxy substance incompletely esterified with fatty acid having 8 to 18 carbon atoms, and (2) compound having formula described in patent. No 2,398,296. Albert Epstein and Morris Katzman to The Emulsol Corp.

Parasiticidal preparation, 2-chloronaphthoquinhydrone-1, 4. No. 2,396,665. Elbert Ladd to United States Rubber Co.

Spotting paste comprising oil-soluble dye dispersed in mineral-base carrier and being removable by wiping. No. 2,396,667. Leon Adler.

Modifying properties of bituminous materials, which comprises incorporation of member of class of benzidine, diphenylamine and alpha-naphthylamine, and heating mixture. No. 2,396,669. Laszlo Auer.

Production of petroleum mahogany sulphonic products which comprises treating non-settled acidified petroleum hydrocarbon oil containing petroleum mahogany sulphonic acids, acid sludge and unreacted oil, derived from sulphuric acid treatment of straight overhead distillate, under sulphonating conditions, with liquid solvent from normally liquid benzol, benzol homologues and saturated chlorinated aliphatic hydrocarbons. No. 2,396,673. Manuel Blumer to L. Sonneborn Sons, Inc.

Flashing cement for cold application having in admixture with asbestos fibre and low-boiling hydrocarbon solvent vaporizable at atmospheric temperatures, a bituminous base consisting of coal-digestion pitch. No. 2,396,690. William Fair, Jr. to Koppers Co. Inc.

Smoke screen composition having long shelf life comprising mineral oil in which inhibitor of combustion is absent, oil soluble dyestuff, dry particles of ammonium chloride which volatilize on heating, and water soluble metallic soap to maintain particles of ammonium chloride in suspension in mineral oil. No. 2,396,710. Harold Levey and Alonzo Patterson; said Levey to said Patterson.

Composition for blending with oils selected from animal and vegetable oils and blends of such oils with mineral oils to form instantaneously emulsifiable products, which comprises alkali metal petroleum mahogany sulfonate, alkali metal oleate, free oleic acid, members from glycols and glycol monoalkyl ethers, and of water. No. 2,396,718. Abraham Moscowitz to L. Sonneborn Sons, Inc.

Lubricant comprising lubricating oil, and addition agent comprising metal compound of reaction product of phosphorus pentasulfide and aliphatic saturated alcohol to prevent thiophosphate formation. No. 2,396,719. John Musselman and Herman Lankelma to The Standard Oil Co.

Manufacturing lubricating grease which comprises mixing high molecular weight organic monobasic acid with Friedel-Crafts type metal halide catalyst spent in hydrocarbon conversion process and consisting of hydrocarbon complex of halide of metal having valence of at least 3, heating mixture and blending resultant soap into mineral lubricating oil base stock. No. 2,396,744. Arnold Morway to Standard Oil Development Co.

Solution for cleaning metal preparatory to painting including water, phosphoric acid, and tertiary alkylarylpolyglycol. No. 2,396,776. Alfred Douty and Ferdinand Heller to American Chemical Paint Co.

Additional patents on all other classifications from the above volumes will be given next month.

Abstracts of Canadian Patents

Collected from Original Sources and Edited

Requests for further information or photostated copies of the patents reported below should be addressed to the Commissioner of Patents and Copyrights, Department Secretary of State, Ottawa, Canada.

CANADIAN PATENTS

Granted and Published Feb. 19, 1946

Carrying out a catalytic reaction involving hydrocarbons at temperatures of more than 200° C in the presence of a fine-pored catalyst by employing a catalyst which after having been heated to temperatures of between 200° and 800° C possesses a pH-value of from 2.5 to 5. No. 433,200. G. Farbenindustrie Aktiengesellschaft (Fritz Stoewener, Friedrich Becke).

Granted and Published Feb. 26, 1946

Composition for pretreatment in the dyeing of human hair comprising an amide of an alkylene polyamine with a higher fatty acid component containing from 6 to 20 carbon atoms. No. 433,219. John W. Orelup.

Seed-borne disease control composition containing a toxic amount of guanidine pentachlorphenate. No. 433,233. American Cyanamid Co. (Vartkes Migrdichian).

Insecticide containing as its essential active ingredient a halogen substituted acrylonitrile. No. 433,235. American Cyanamid Co. (Harold S. Davis).

Controlling organisms carried by seeds which includes applying thereto a toxic quantity of 1,2-dibromo-1,2-dithiocyanoethane. No. 433,236. American Cyanamid Co. (William Moore).

Utilizing the values in waste pickle liquors by mixing a quantity with waste bauxite and carbon and sintering. No. 433,261. Chemical Construction Corp. (Blakeslee Barnes).

Electrolytic cell casting mould. No. 433,262. Consolidated Mining & Smelting Co. Ltd. (Alexander Whiteside Moore, Frank Benjamin Moran, Herbert Louis Christian, Darcy Drummond Morris).

Colloided nitro-cellulose propellent powder gun charge having an alkali metal antimonyl tartrate distributed unequally through it. No. 433,270. Imperial Chemical Industries Ltd. (Thomas Thomson, Edward Whitworth).

Casing for food products composed of a plastic film in which is incorporated a wood distillate to give the food products a smoky flavor and odor.. No. 433,279. Oppenheimer Casing Co. (Seymour Oppenheimer).

Insecticidal composition comprising an emulsifiable mineral oil insecticidal material and a minor portion of diisoamyl ketone. No. 433,288. Shell Development Co. (Clifford J. Boissonou, Wallace J. Yates).

Producing dichloroacrylyl chloride by pyrolyzing trichloropropionyl chloride to separate one mol of hydrogen chloride therefrom. No. 433,313. Wingfoot Corp. (Joy Gabriel Lichty).

Disinfectant for throat and mouth comprising a mixture of an aqueous liquor of ashes of birch and camphor. No. 433,320. Ing Lloyd, Antonic Allevato.

Granted and Published March 5, 1946

Self-conforming electrode clamp design. No. 433,333. Laurence Edward Leonard.

Soap composition adapted for use in hard water, sea-water and acid aqueous solutions, comprising a water-soluble soap and a mixture of monoalkyl derivatives of sodium phenol sulphonate. No. 433,360. Allied Chemical & Dye Corp. (Lawrence H. Flett).

Improvement in the manufacture of paper pulp which consists in reducing the material into pieces and heating in a solution containing metasilicate, borax and sodium sulphide. No. 433,363. Alpha Cellulose Corp. John Neumann).

Thermally treating magnesium and alloys, minimizing deterioration of the metal during treatment by providing a fluorine-containing substance in vapour form in the atmosphere surrounding the metal. No. 433,364. Aluminum Co. of America (Philip Trimble Stroup).

Softening textiles by impregnating the salt of a substituted carbamyl compound. No. 433,367. Arnold, Hoffman & Co. Inc. (Willard L. Morgan, Earle David McLeod).

Preparing a heat-convertible, fusible polymer of divinyl benzene which comprises polymerizing a solution of divinyl benzene in a dialkyl benzene in the presence of both an added inhibitor consisting of copper and an added polymerization catalyst. No. 433,382. Canadian General Electric Co. Ltd. (Gaetano F. D'Alelio).

Producing anhydrous calcium chromate by forming an aqueous solution of calcium nitrate and sodium chromate, and heating under pressure to a temperature higher than about 180°C. No. 433,401. Chromium Mining & Smelting Corp. (Evan A. MacColl).

Glass which will become black throughout when slowly cooled or heated through its upper annealing range but which will be clear or white when rapidly cooled from some higher temperature. No. 433,403. Corning Glass Works (Martin E. Nordberg).

Production of alphamethyl glycerol by oxidizing crotonaldehyde in a substantially non-alkaline medium to alphamethylglyceraldehyde and thereafter catalytically hydrogenating the alphamethylglyceraldehyde to alphamethyl glycerol. No. 433,404. The Distillers Co. Ltd. (Hanns Peter Staudinger, Karl Heinrich, Walter Tuerck).

Method of treating wheat flour for the recovery of starch and gluten. No. 433,414. Honorary Advisory Council for Scientific and Industrial Research (Albert Lorne Shewfelt, Gordon Albert Adams).

Liquid for the generation of steam devoid of foaming and priming tendencies when heated to the boiling point, comprising water and a very small amount of a diacyl derivative of an alkylenediamine. No. 433,431. National Aluminate Corp. (Paul G. Bird, Arthur L. Jacoby).

Composition for use in the destruction of weeds comprising a mixture of 50 to 60 penetration at 77°F. asphalt and a light petroleum distillate of aromatic character. No. 433,449. Standard Oil Development Co. (Herbert G. M. Fischer).

Process of preparing a concentrate of the active gelatinizing principle of sea moss. No. 433,465. Jacques Wolff & Co. (Albert A. Lund).

Production of coloured cellulose acetate fibres by spinning into fibres a cellulose acetate solution containing a 1:4-di-(arylamino)-anthraquinone free from nuclear substituents other than the arylamino groups. No. 433,472. Claude George Bonard (Edmund Stanley, Christopher Stanley Argyle, Henry Charles Olpin).

Coloration of cellulose acetate fibres by use of 1:4-di-(ortho-methoxyphenylamino)-anthraquinone in aqueous ethyl alcohol. No. 433,473. Claude George Bonard (Alexander James Wesson).

Luminescent substance comprising calcium tungstate and crystals of tricalcium orthophosphate. No. 433,474. Societe pour l'Etude et l'Exploitation des Matieres Luminescentes (Marcel Servigne).

Granted and Published March 12, 1946

Recovering sulphur dioxide from a gas mixture by absorbing the sulphur dioxide with an aromatic amine reagent and treating the gases to release the SO_2, and re-cycling. No. 433,516. American Smelting and Refining Co. (Edard P. Fleming and T. Cleon Fitt)

Phosphor consisting essentially of a matrix of alkaline-earth-metal sulphide activated with europium in the divalent state, and characterized by red to pink fluorescence under the excitation of 2537 A. or 3650 A. radiation with red afterglow. No. 433,525 Canadian General Electric Company, Ltd. (Harry M. Fernberger)

Interpolymer of more than 90 per cent but not exceeding 99.9 per cent of vinyl chloride and at least 0.1 per cent but less than 10 per cent of di-ethyl itaconate. As a new product an interpolymer of 99 parts vinyl chloride and 1 part di-isopropyl itaconate. No. 433,526. Canadian General Electric Company, Ltd. (Gaetano F. D' Alelio)

Process of reacting a crude glyceride with an alkanol of not more than 4 carbon atoms under substantially anhydrous conditions, separating the glycerine and recovering monoalkyl esters of the fatty acids contained in said glycerides. No. 433,531. Canadian Industries Ltd. (George Burt Bradshaw, Walter Christian Meuly)

In the manufacture of anhydrous sodium sulphate the step of forming sodium sulphate by calcining a mixture of sodium bisulphate and sodium chloride in equivalent amounts at a temperature at which Na_2SO_4. No. 433,532. Canadian Industries Ltd. (Max Lowell)

Process for heat-sealing films of material, at least one of which is self-supporting normally solid ethylene polymer film. No. 433,533. Canadian Industries Ltd. (George Henry Latham)

Combined powder container and sprayer. No. 433,534. Canadian Industries Ltd. (Arthur Fletcher)

Apparatus for cutting a tapered filament composed of a series of relatively uniform tapered sections, at a predetermined point in each of said tapered sections. No. 433,535. Canadian Industries Ltd. (Paul W. Crane, Reuben T. Fields)

Chemical fungicide composition comprising a homogeneous solution of a water-insoluble hydroxy copper soap in aqueous ammonia. No. 433,579. Nuodex Products Co., Inc. (Leo Roon)

Densifying device for powdery materials. No. 433,588. Shawinigan Chemicals Ltd. (Charles Kaufmann and Arthur Hoijord Andersen)

Production of an olefin oxide by reacting an olefin with oxygen in the presence of a massive silver catalyst having a continuity of smooth surface and in the absence of added water vapor at a temperature of 425° to 500° C. and under substantially normal atmospheric pressure. No. 433,589. Shell Development Co. (Harry deV. Finch, Theodore W. Evans and Martin deSimo)

Recovering a dry product from spraying the fermentation residue into a stream of inert gas at a temperature not substantially lower than 900° F. No. 433,598. U. S. Industrial Chemicals, Inc. (Wolcott Dennis)

Aqueous bath for electrodepositing copper, comprising essentially in solution 45 to 75 g/1 of copper, 75 to 155 g/1 of formate radicals and 20 to 30 g/1 ammonium radicals, and having a pH value between 2 and 4 electrometric. No. 433,603. United Chromium Incorporated. (Jesse E. Stareck, Frank Passalacqua)

Granted and Published March 19, 1946

Alloy for impact extrusion purposes comprising about 12 per cent tin, 3 per cent antimony, 1 per cent copper, and the balance substantially all lead. No. 433,648. Bristol-Myers Co. (Gerhard J. Derge)

Liquid composition comprising styrene and a proportion of 2-nitro-4.6-dibromophenol sufficient to inhibit polymerization of the styrene. No. 433,684. The Dow Chemical Company. (Raymond F. Boyer and Louis C. Rubens)

Method of forming a thin filament from a stream of hardenable liquid issuing from an orifice. No. 433,688. Fiberglas Canada Ltd. (Stuart M. Dockerty)

Codling moth ovicide and larvicide comprising as an active insecticidal ingredient the compound dihydroanthracene. No. 433,691. General Chemical Company (William Knapp)

(*To be continued*)

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

420,054. C. R. Lord & Paul Halm, East Orange, N. J.; filed Dec. 2, 1944; Serial No. 477,160; for mixture of waxes, gums, and plasticizers for covering cracks; since Sept. 1944.

420,063. Daniel J. Klein, as Allied Exterminating Co., N. Y.; filed May 31, 1945; Serial No. 484,027; for disinfectants, insecticides; since Jan. 15, 1945.

420,175. William J. Lenz, as Lenz Testing Labs., Louisville, Ky.; filed Jan. 31, 1945; Serial No. 479,243; for energizing preparation added to fuels; since September 1944.

420,315. General Electric Co., Schenectady, N. Y.; filed July 4, 1944; Serial No. 471,919; for treating water-non-repellent materials to render same water repellent; since Mar. 13, 1943.

420,321. Laundry Supply Co., Inc., Chicago, Ill.; filed Oct. 18, 1944; Serial No. 475,430; for household bleach; since July 11, 1944.

420,344. Walter D. Jenkins, as The Seal-Tite Co., Los Angeles, Calif.; filed May 14, 1945; Serial No. 483,325; for automobile polish; since Feb. 8, 1945.

420,431. The B. F. Goodrich Co., N. Y., and Akron, Ohio; filed Apr. 10, 1943; Serial No. 459,787; for resin base water paint; since Mar. 3, 1943.

420,454. Refractory Mica Products, Inc., Irvington, N. J.; filed Apr. 6, 1945; Serial No. 481,802; for refractory parting compound in dry powdered form; since Jan. 2, 1939.

420,455. Refractory Mica Products, Inc., Irvington, N. J.; filed Apr. 6, 1945; Serial No. 481,803; for dry, powdered coating compound; since Jan. 2, 1939.

420,459. The Munising Paper Co., Munising, Mich., and Chicago, Ill.; filed June 7, 1945; Serial No. 484,267; for polishing sheet containing cleansing agent for metal surfaces; since Oct. 17, 1944.

420,460. Protective Coatings Corp., Belleville, N. J.; filed June 20, 1945; Serial No. 484,798; for fabrics impregnated with oils, as oilcloth; since Mar. 23, 1944.

420,468. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; Serial No. 488,347; for lacquers and paint enamels; since Aug. 15, 1931.

475,661. National Mortar & Supply Co. of Pittsburgh, Pittsburgh, Pa.; filed Oct. 24, 1944; for refined lime; since March 1943.

475,866. The Parker Pen Co., Janesville, Wis.; filed Oct. 30, 1944; for water soluble organic solvent for ink; since July 11, 1942.

477,966. Burnham Soluble Iodine Co., Auburndale, Mass.; filed Dec. 27, 1944; for water purification tablets; since July 25, 1944.

477,984. The Taintor Co., N. Y.; filed Dec. 27, 1944; under 10-year proviso; for whiting; since Dec. 1, 1892.

482,130. Attapulgus Clay Co., Wilmington, Del., and Philadelphia, Pa.; filed Apr. 14, 1945; finely divided Fuller's earth; since Feb. 23, 1945.

483,943. United Chromium, Inc., N. Y.; filed May 29, 1945; for organic solvents, etc.; since Mar. 29, 1935.

488,269. Hercules Powder Co., Wilmington, Del.; filed Sept. 11, 1945; for menthylphenol, as stabilizer in cellulose plastics; since Aug. 14, 1945.

488,343. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for coating compositions containing vinyl resins; since July 1, 1934.

488,344. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for lacquers and paint enamels; since July 21, 1936.

488,349. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for crystallizing lacquers; since Feb. 15, 1930.

488,350. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for enamels containing synthetic resins and varnishes; since Apr. 1, 1940.

488,351. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for lacquers and paint enamels; since Aug. 10, 1937.

488,352. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for adhesive shoe cements; since Jan. 15, 1931.

488,357. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for paints; since 1930.

488,358. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for paints; since 1904.

488,642. Fritzche Brothers, Inc., N. Y.; filed Sept. 18, 1945; for fixative for compounded oils; since July 31, 1945.

488,793. Worthington Products Co., Inc.; Arlington, Va.; filed Sept. 20, 1945; for insecticides; since Aug. 18, 1945.

489,392. E. I. du Pont de Nemours & Co., Wilmington, Del.; filed Oct. 4, 1945; for penetrating, lubricating composition; since May 5, 1938.

489,485. Qualitrol Corp., East Rochester, N. Y.; filed Oct. 5, 1945; for measuring instruments; since Feb. 9, 1945.

489,655. Champion Chemical Works, Inc., N. Y.; filed Oct. 9, 1945; for lye; since 1895.

489,779. John T. Walker, as Allied Products Co., Chicago, Ill.; filed Oct. 10, 1945; for removing rust; since Feb. 28, 1945.

490,114. General Dyestuff Corp.; N. Y.; filed Oct. 18, 1945; for dyestuffs; since Sept. 21, 1945.

490,191. Hermetite Corp., Nutley, N. J.; filed Oct. 19, 1945; for impregnating fabrics to render same moisture and air proof; since Apr. 1, 1923.

490,234. Chipman Chemical Co., Inc., Bound Brook, N. J.; filed Oct. 20, 1945; for insecticides; since Dec. 5, 1944.

490,253. Monsanto Chemical Co., St. Louis, Mo.; filed Oct. 20, 1945; for solid detergents; since Oct. 9, 1945.

490,411. American Cyanamid Co., N. Y.; filed Oct. 24, 1945; for finishing resins for controlling gas fading, shrinkage, wrinkling, and slipping of textile fabrics; since Oct. 9, 1945.

490,475. Associated Products, Inc., Chicago, Ill.; filed Oct. 25, 1945; for liquid and powder insecticides; since Sept. 19, 1945.

491,246. Du Pont Semesan Co., Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.; filed Nov. 8, 1945; for agricultural and horticultural fungicides; since Sept. 29, 1945.

491,380. A. R. Maas Chemical Co., South Gate, Calif.; filed Sept. 24, 1945; for trisodium phosphate crystals; since July 19, 1945.

491,459. California Spray-Chemical Corp., Wilmington, Del., and Richmond, Calif.; filed Nov. 13, 1945; for parasiticides; since Sept. 4, 1945.

491,466. Richard E. Cole, Columbus, Ohio; filed Nov. 13, 1945; for rubber-containing cement; since Oct. 1, 1945.

491,843. H. Kohnstamm & Co., Inc., N. Y.; filed Nov. 19, 1945; for colors in form of powder and pulp; since 1882.

492,389. The Miami Products & Chemical Co., Dayton, Ohio; filed Nov. 29, 1945; for insecticide; since Oct. 2, 1945.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, March 19-April 9.

SCRATCH-OFF
420,054

MICAWASH
420,455

ATTACLAY
482,130

SOLAC
488,352

BIG BONANZA
489,655

NO-SECTS
490,475

PESTRID
420,063

SILVER-SHEETS
420,459

UNICHROME
483,943

M&W INDUSTRIAL FINISHES
488,357

TERSAN
491,246

MOTOR-VITELIZER
420,175

AQUASTOP
420,460

488,269

COLODEX
489,779

TRI-SO
491,380

DRI-FILM
420,315

METALUSTRE
420,468

PIONEERS IN PROTECTION M&WC° 1876
488,358

MULTIFEN
490,114

GAMMACIDE
491,459

WHITE GLO
420,321

MICRO-MAG
475,661

DURVIN
488,343

HERMETITE
490,191

SAVONAFIX
488,642

LATEXOL
491,466

SOLV-X
475,866

DYKAST
488,344

P-C-H
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SEAL-TITE
420,344

PRISMLAC
488,349

"ATOMIC"
488,793

ATLAS COLORS
491,843

BURSOLINE
477,966

RAYDUR
488,350

DU PONT
489,392

STEROX
490,253

AQUA SHEEN
420,431

TAINTOR'S
477,984

SLATITE
488,351

QUALIGAGE
489,485

AEROSET
490,411

Black-Out
492,389

MICAPARTE
420,454

More New Fluorine Compounds by General Chemical

POTASSIUM KF • HF BIFLUORIDE

POTASSIUM KF • 3HF POLYACID FLUORIDE

SOME POTENTIAL USES:

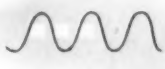
HEAT TREATING—Means of controlling the melting point of heat-treating salts.

GLASS—In etching glass or other silicon-bearing products. As "frosting" agents.

CERAMICS—As opacifiers. As materials to increase the fluidity and alter the melting point of the mix.

CHEMICAL PROCESSING Source of HF in dry form. For preparation of elemental fluorine by electrolysis.

ELECTRONICS—Special medium for etching quartz crystals.



MINING—Agents for digestion of insoluble ores.

METALLURGY—As ingredients in fluxes and pastes for welding, brazing or soldering. For surface preparation of aluminum and stainless steel before spot welding.

General Chemical Fluorine Research announces Potassium Bifluoride and Potassium Polyacid Fluoride to American Industry. These are versatile, reactive products whose properties indicate varied applications. For example, consider their potentialities in the fields suggested here.

Perhaps such uses point to a place for either Potassium Bifluoride or Potassium Polyacid Fluoride in *your* development or production program. Experimental samples are available from General Chemical Company, Fluorine Division, 40 Rector Street, New York 6, N. Y., or through the nearest Sales and Technical Service Office.

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Remember when changing to new tires was just another chore? Today it's a pleasure, for it means freedom from that ever-present worry which has plagued all of us whose tires have been living on borrowed time during these past few years.

It's an additional pleasure also to know that these new tires are improved tires, superior in many important respects to those of prewar days. Advances in the quality of natural rubber tires, as well as synthetics, are constantly being made, thanks to the untiring efforts of the rubber industry and the industries that supply it with working materials. Witco Chemical Company has made many outstanding contributions in the form of specially engineered carbon blacks which impart new and desirable properties. For example, a special furnace type black produced by Witco gives added strength and reduces the tendency of synthetic rubber to overheat in heavy duty tires. Other Witco blacks, engineered to meet manufacturers' special processing requirements are helping to provide the exact degrees of tensile strength, elasticity, abrasion resistance, tear resistance and other qualities necessary for endurance and long tire life, not only in tires but other rubber products. In addition, Witco's research laboratories are constantly striving to advance the standards of a variety of products in which carbon black is used . . . such as paints, printing inks, paper, plastics, leather, linoleum, polishes.

This service in carbon black is part of Witco's expanding service in chemicals, oils, pigments and asphalts. A new booklet giving interesting information on fundamental properties of various Witco blacks will be sent to you on request.

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